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Monthly Message

Miss Catherine Letterman, the eldest daughter of Doctor Jonathan Letterman for whom Letterman Army Hospital is named, died on 14 October 1957 in her 94th year, in the Presbyterian Hospital in Albuquerque, New Mexico. The Army and Air Force owe much to Doctor Letterman because he was one of three to rescue the Army Medical Service from its mire of hesitancy and inefficiency in the early days of the War Between the States. As the war started, the medical service was so unprepared and disorganized that the public demanded an investigation, and President Lincoln appointed a Sanitary Commission to explore the whole problem. The Commission insisted that former Assistant Surgeon William A. Hammond, then only 34 years old, be appointed Surgeon General; this was done in 1861.

In 1862 Surgeon H. S. Hewitt, U. S. Volunteers, was the Surgeon for the Army of the Tennessee under General Grant, and Doctor Jonathan Letterman was Medical Director of the Army of the Potomac. Both independently had similar ideas as to the need for a complete reorganization of medical services in the field.

In July 1862 Surgeon Charles E. Tripler was succeeded in the Army of the Potomac by Assistant Surgeon Letterman who wrote at that time, "The Medical Department of the Army was in a deplorable condition." He promptly reorganized the Medical Department of the Army of the Potomac and introduced system, order, and efficiency. Although the Battle of Antietam occurred only three months after his appointment, this was the first time in which all of the wounded were placed under shelter within 24 hours. The organization planned by Doctor Letterman was the prototype of the present Field Medical Service of the Army, and today's field, evacuation, and general hospitals, and orderly evacuation of patients are not too different from what he organized.

Miss Catherine Letterman and her younger sister, Miss Madeline, who survives, now aged 90,* lived in Washington for many years, and Miss Catherine was the personal secretary of President Taft. Secretary Brucker learned about the Misses Letterman

and wrote Miss Catherine a letter in early October expressing the interest of the Army and its gratitude for the enduring contribution their father had made to the Army Medical Corps. Ten days before her death Miss Catherine wrote the Secretary in appreciation for his letter.

Frank B. Berry

FRANK B. BERRY, M. D.
Assistant Secretary of Defense
(Health and Medical)

*Since this article was written, Miss Madeline Letterman also has died.

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Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal.*

FRANK B. BERRY, M. D.,
Assistant Secretary of Defense (Health and Medical).

MAJOR GENERAL SILAS B. HAYS,
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Surgeon General, United States Navy.

MAJOR GENERAL DAN C. OGLE,
Surgeon General, United States Air Force.

UNITED STATES ARMED FORCES MEDICAL JOURNAL

Volume IX February 1958 Number 2

POSTERIOR COLPOTOMY

A Method for Diagnosis and Definitive Treatment

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POSTERIOR colpotomy has long been recognized by gynecologists as a means of determining the presence and nature of pathologic conditions in the pelvis by direct visualization and palpation of the pelvic contents. The vaginal approach has been less widely used for definitive surgery, but in reviewing the literature[1-6] one discovers that in recent years more surgeons are advocating posterior colpotomy for both diagnosis and treatment of certain pelvic conditions. The reduced postoperative discomfort and hospitalization time have seemed to make this the approach of choice in many instances. The work reported here confirms the value of colpotomy in the diagnosis and treatment of a number of pelvic diseases.[5]

MATERIAL

During the period January 1951 to January 1957, posterior colpotomy was performed on 47 patients at Colorado General Hospital. At Fitzsimons Army Hospital, between January 1955 to March 1957, 34 posterior colpotomies were performed. Essentially the same indications and technic were used at both hospitals, and all 81 patients are included in this report.

The age range of the patients was from 16 to 75 years. Some patients were nulliparous; the majority were multiparous.

INDICATIONS

Colpotomy was selected as the procedure of choice for tubal ligation in patients who were not in the immediate postpartum or

From Fitzsimons Army Hospital and Colorado General Hospital, Denver, Colo.

postabortal period. In patients with a suspected diagnosis of ectopic pregnancy, a posterior colpotomy, with or without dilatation and curettage, was made to establish the diagnosis and perform definitive surgery when possible. Colpotomy was not employed in cases where the diagnosis was obvious because of shock or loss of blood. Where bimanual examination was an inadequate means of evaluating pelvic pathologic conditions, colpotomy with palpation and direct visualization of the pelvic contents was selected. In addition, ovarian cystectomy and oophorectomy were done through the vaginal approach in many instances.

Previous surgery, endometriosis, or previous pelvic inflammatory disease were not considered contraindications to colpotomy, although it was known that abdominal laparotomy might have to be resorted to for definitive surgery. Age and parity were not considered contraindications. The indications for posterior colpotomy in these 81 patients were suspected ectopic pregnancy, 40; elective tubal ligation, 14; suspected ovarian pathology, 14; unsatisfactory pelvic examination, 7; and suspected endometriosis, 6.

The procedures carried out through colpotomy incision were: ovarian cystectomy, 18; tubal ligation (Pomeroy technic), 14; salpingectomy, unilateral, 8; pelvic examination only, 7; biopsy (endometriosis), 5; bilateral wedge resection ovaries, 4; suture of ruptured, bleeding ovarian cysts, 4; oophorectomy (bilateral), 2; and oophorectomy (unilateral), 2. Dilatation of the cervix and curettage of the endometrium accompanied the procedure in 20 patients, and abdominal laparotomy was resorted to in three patients.

RESULTS AND DISCUSSION

The postoperative diagnoses in the 81 patients were diseased ovary, 25; elective tubal ligation, 14; ectopic pregnancy, 10; no pathologic condition in pelvis, 13; threatened abortion, 6; incomplete abortion, 5; endometriosis, 5; and pelvic inflammatory disease, 3. The average postoperative hospital stay for the patients in this series, including the three who required laparotomy, was three days. Similar procedures performed during the same period, but by abdominal approach, required an average hospital stay of seven days.

TECHNIC AND PROCEDURES

The technic used is essentially that described by Bradbury.[4] With the patient under conduction or inhalation anesthesia and in the lithotomy position, the vagina was prepared in the usual manner. A weighted speculum was inserted in the vagina and the posterior lip of the cervix grasped with a tenaculum and elevated toward the symphysis. A transverse incision was made through the vaginal mucosa between the uterosacral ligaments. The vaginal

mucosa and the underlying fascial tissue were separated from the peritoneum by blunt dissection, and the peritoneum incised. Bimanual examination was performed with two fingers through the colpotomy incision, the entire pelvic contents being easily palpated.

The weighted speculum was replaced in the vagina with the tip in the vaginal incision. With the aid of thin right-angle retractors and ring forceps, the tubes, ovaries, and posterior surface of the uterus could be delivered into the vagina for direct visualization in most instances. If additional exposure was required, the uterosacral ligament and cardinal ligament was detached on one or both sides of the cervix and reattached on completion of the procedure. Salpingectomy, tubal ligation, ovarian cystectomy, and oophorectomy usually could be accomplished without difficulty. If extensive adhesions from previous surgery, inflammatory disease, or endometriosis prevented definitive surgery through the vagina, the incision was closed and laparotomy performed.

On completion of the procedure, the peritoneum, fascia, and vaginal mucosa are closed in one layer with interrupted sutures of chromic catgut.

In two patients with ectopic pregnancy, salpingectomy was difficult and the colpotomy was closed and a laparotomy was done. In the remaining eight patients with ectopic pregnancy the salpingectomy was completed through the colpotomy.

The patients with endometriosis diagnosed at the time of surgery had no surgical procedures done other than biopsy of the affected areas.

Ovarian cysts up to six cm in diameter were removed without difficulty or rupture; bleeding ovarian cysts were sutured. Bilateral ovarian wedge resection was performed as treatment for four patients with Stein-Leventhal syndrome.

Patients with ectopic pregnancy or incomplete abortion had a dilatation and curettage at the same time as the colpotomy. In one patient, the diagnosis of pyosalpinx was made and laparotomy was performed to excise the involved tube.

Two patients, one with a ruptured ectopic pregnancy and one with pre-existing pelvic inflammatory disease, developed pelvic abscesses postoperatively that required drainage through the previous colpotomy incision. Postoperative morbidity was present in the two patients who developed pelvic abscesses and in two other patients who were diagnosed as having pelvic inflammatory disease. None of the remaining patients had a temperature over 100.4°F after the first postoperative day. One patient was admitted two weeks postoperatively with a history of severe vaginal

bleeding, but no bleeding point was observed and the patient was discharged without further treatment.

Patients were ambulatory within 12 hours of the surgical procedure, without the usual postoperative discomfort. The average patient was discharged from the hospital on the second or third postoperative day and was back to normal activity at home within three or four more days. The chief postoperative complaint was mild shoulder pain that abated within 24 hours.

We prefer posterior colpotomy to culdoscopy because it permits better visualization of pelvic structures and is accompanied by minimal postoperative discomfort and hospitalization. Culdoscopy in our hands is cumbersome, discomforting to the patient, and of limited diagnostic aid. Colpotomy has the added advantage of providing a satisfactory exposure for definitive surgery in some instances.

SUMMARY

In 81 cases in which posterior colpotomy was employed, the procedure proved to be valuable in the diagnosis of pelvic pathology, while in many instances definitive surgery could be performed through the colpotomy incision. The hospital stay was reduced to an average of three days, and the patients are more comfortable during the postoperative period.

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POSTOPERATIVE PAROTITIS

A Reappearing Disease

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THE INCREASED incidence of infections due to antibiotic-resistant micrococci in hospitalized patients is reflected in the numerous articles recently devoted to this subject. Hemolytic *Micrococcus pyogenes* var. *aureus (Staphylococcus aureus)* has been mentioned as a frequent offender. An unemphasized aspect of this problem is the reappearance of postoperative parotitis as a complication of surgery. As recently as 1955 this was referred to as a vanishing disease.[1] In one of the most comprehensive reviews of the subject, Coughlin and Gish[2] described the entity as encompassing all acute inflammations of the parotid gland except that occurring in epidemic parotitis or mumps. In this article only acute parotitis as it appears as a postoperative complication will be considered.

Even in the preantibiotic era the most common bacterial pathogen in surgical parotitis was *M. pyogenes* var. *aureus*.[2] Since the use of antibiotics has become routine throughout all phases of medical practice, many antibiotic-resistant strains of this organism have appeared.[3] These resistant strains frequently are found in members of a hospital community. Detailed studies were made of the bacterial flora of the skin and nasopharynx of patients and personnel of Massachusetts Memorial Hospitals.[4] The predominant organism was found to be *M. pyogenes*, var. *aureus*, hemolytic and antibiotic-resistant; and this finding was intimately related to an increased incidence of *M. pyogenes* var. *aureus*-infected wounds noted in that institution.[4]

MATERIAL AND METHODS

Frequency of Postoperative Parotitis. From 1 July 1949 to 1 July 1956, only 2 cases of postoperative parotitis occurred in 171,826 major and minor surgical procedures performed at this hospital. During the period of 1 July 1956 to 1 July 1957, 47,947 major and minor surgical procedures were performed, and there were 7

From U. S. Naval Hospital, San Diego, Calif.

cases of postoperative parotitis. In the former period the incidence was 1 case of postoperative parotitis per 85,913 surgical procedures. During the past year the incidence was 1 case per 6,950 surgical procedures. This is a twelvefold increase in the incidence of this complication and is considered to be related to the general increase in the number of *Micrococcus pyogenes* infections noted here and throughout the country.

Postoperative Wound Infections. A moderate increase in the numbers of postoperative wound infections was noted on the surgical service of this hospital during the latter half of 1956 and early months of 1957. This, coupled with the alarming increase in the incidence of postoperative parotitis noted during that period, led to an effort to determine the carriers of the organism in the operating room and ward staff personnel. Cultures of nasopharyngeal secretions were performed on 136 personnel, and 7 of these cultures were positive for *M. pyogenes* var. *aureus*. The infectious agent was determined in 5 of the 7 cases of postoperative parotitis and was consistently *M. pyogenes* var. *aureus*. Cultures were not performed in two cases because the process was recognized early and aborted by vigorous treatment. It is our feeling that the problem of postoperative infections is definitely related to the exposure of the patient to these antibiotic-resistant micrococci carried by large numbers of hospital personnel.

PREVENTIVE MEASURES

The prevention of this complication is empirical, as the causative mechanism remains undetermined. The same measures that have brought about a decrease in the number and severity of postoperative wound infections can be expected to reduce the incidence of postoperative parotitis. Such steps as the exclusion of hospital personnel who are nasopharyngeal carriers from active ward duty and from operating or dressing rooms, the use of double masks during surgery, the changing of masks between cases, and the wearing of a mask and sterile gloves while changing a surgical dressing are time-tested aseptic principles to which one should rigidly adhere, thereby reducing the incidence of infections in general.[5] The previously accepted measures of oral hygienic care and stimulation of salivary flow are equally applicable today. Early diagnosis is essential. The examination of the parotid area should be included in the daily physical evaluation of the postoperative patient in order to allow early institution of vigorous treatment. Progression of the disease may be exceedingly rapid. One patient in this series presented only minimal swelling and tenderness in the parotid area with slight pain on mastication, and 12 hours later the picture was one of full-blown parotitis with massive facial edema and impending airway obstruction.

TREATMENT

The treatment of surgical parotitis is basically the same as that of other infections. In the early case with minimal symptoms and physical findings, the stimulation of salivary flow induced by chewing gum or sucking on hard candy, the application of continuous moist heat, and the use of massive doses of antibiotics has served to limit the infection. Our experience has led us to use erythromycin and Gantrisin (brand of sulfisoxazole) in combination, having noted that the greater number of *M. pyogenes* var. *aureus* strains common to this hospital respond to these drugs, though they are resistant to penicillin. Chloramphenicol also has been used with excellent results. In the present series, x-ray therapy was used early in the treatment in five of the seven cases. One of the objections to radiotherapy has been that the edema secondary to radiation may prevent natural drainage of the infection through the parotid duct. It is our impression that drainage through the duct is so minimal as to have little or no effect on the inflammatory process occurring throughout the gland. We have noted that subsequent to irradiation the patients are both symptomatically and clinically improved. The patients received a total dose of 800 r in air, given over a four- to six-day period with varying schedules of one to two treatments per day.

In the event that the previously mentioned measures fail to limit the infection, surgical incision and drainage of the gland is indicated. This should not necessarily be delayed until fluctuation is present. Due to the anatomic situation of the gland between fascial planes of the face and neck, marked necrosis can precede clinical fluctuation. Evidence of facial nerve paresis, impending airway obstruction, or nasopharyngeal obstruction should be considered as absolute indications for immediate surgical intervention.

The technic for drainage that we have employed is carried out under endotracheal anesthesia. A curvilinear, submandibular incision following the natural skin creases, which may be extended to the preauricular area, is used. After elevation of skin flaps, a hemostat is delivered through the tense capsule of the gland at multiple sites. An effort should be made to include the deep lobe of the gland and its preauricular extension in the area drained. If drainage is instituted early one should not expect to obtain true purulent material, but rather a cloudy fluid not unlike that found in early abscesses of the breast caused by *M. pyogenes* var. *aureus*. The relief from pressure symptoms obtained by incision and drainage is gratifying and appears to limit the amount of necrosis that occurs. The wound is packed open and allowed to heal by secondary intention, despite which, the cosmetic results have been satisfactory. Persistent salivary

fistulas have not been a problem in this series of cases. If airway obstruction is believed present, tracheotomy is performed at this time. In addition, a feeding tube is inserted through the nose to provide for postoperative alimentation. Postoperative care of the wound itself includes hot moist packs, frequent dressing changes, and daily irrigations with physiologic saline solution.

The following case reports briefly illustrate our experience with this problem.

CASE REPORTS

Case 1. A 35-year-old man was admitted to this hospital for care and evaluation following a cerebral vascular accident. An arteriogram was made on 3 October 1956. Three days later swelling, tenderness, and pain on mastication were noted in the right parotid area. The patient was placed on 250 mg of erythromycin every four hours, but the swelling increased and there was marked toxicity. Surgical incision and drainage were performed on 13 October. Tracheotomy was required. Culture of the drainage revealed *M. pyogenes* var. *aureus*. The patient's response to therapy was excellent, with complete resolution of the process by 10 December.

Case 2. A 29-year-old man underwent subtotal gastrectomy on 3 December 1956. His postoperative course was uneventful until 10 December when he developed an acute left-sided parotitis. He was initially treated with a combination of erythromycin and Gantrisin, and received irradiation therapy. His facial edema progressed; however, and on 12 December surgical incision and drainage were performed. Partial airway obstruction was present, and a tracheotomy was accomplished at this time. The patient improved rapidly, and complete resolution of the process was noted by 7 January 1957.

Case 3. A 60-year-old man with partial obstruction of the large bowel was admitted to this hospital. On 13 December 1956 a left hemicolectomy was performed. On 26 December a transverse colostomy was accomplished because of a large leak along the anastomotic line. Two days later parotitis developed on the right, and the patient was treated with erythromycin, Gantrisin, and irradiation. Incision and drainage of the right parotid gland were performed on 2 January 1957. Parotitis of the left gland developed the next day, and the gland was incised and drained. The patient died 18 January of generalized peritonitis. The postoperative parotitis was believed to have been a major factor in his death.

Case 4. An 18-year-old youth, who one year previously had undergone a total colectomy for ulcerative colitis, was readmitted to the hospital because of recurring symptoms of partial obstruction of the small bowel. On 20 December 1956 he underwent lysis of adhesions, a segmental small bowel resection, and revision of his ileostomy. On 24 December

the patient had a transfusion reaction, followed by oliguria and jaundice, both of which receded over the next 10 days. On 6 January 1957 there was complete dehiscence of his abdominal wound, which was closed the same day with through-and-through wire sutures. Two days later the patient developed a fulminating unilateral parotitis. Treatment with heat, irradiation, and 500 mg of chloramphenicol every six hours intramuscularly was begun, but rapid progression of facial and cervical swelling necessitated surgical incision and drainage the same day. The parotitis rapidly responded, and complete resolution of the process was noted by 15 January. The patient's course was progressively downhill, however, and he died on 2 March. Parotitis was not believed to have been a direct factor in his death.

Case 5. A 52-year-old woman underwent radical mastectomy on 1 February 1957. A partial slough of both medial and lateral skin flaps was noted on 8 February. Secondary closure of the area with split-thickness grafts was performed on 4 March. Minimal swelling, pain, and tenderness of the right parotid gland were noted the next day. Intensive treatment with erythromycin, Gantrisin, moist heat, and oral hygienic measures was instituted immediately. Response to this treatment was excellent, and complete resolution was noted by 11 March. This patient's illness was considerably lessened by early diagnosis and treatment.

Case 6. A 54-year-old man underwent subtotal gastrectomy on 26 February 1957. He had postoperative oliguria through 2 March 1957. Obstruction of the gastrojejunostomy was noted throughout the postoperative period. A partial wound disruption occurred on 6 March. On 25 March, as the culminating factor of a very stormy postoperative course, the patient developed parotitis on the left. This was initially treated with 500 mg of erythromycin every six hours, and heat. Surgical incision and drainage were performed on 28 March. The patient died the next day. Surgical parotitis was believed to have been a definite factor in his death.

Case 7. A 48-year-old man underwent subtotal gastrectomy on 19 June 1957. Right parotitis occurred 3 days later, and immediate treatment with heat, irradiation, and 500 mg of chloramphenicol intramuscularly every six hours was instituted. An excellent response with complete resolution by 29 June was noted. In this patient early diagnosis and intensive therapy was thought to have aborted the process.

COMMENTS

In reviewing this series of seven cases, some general conclusions can be made. Postoperative parotitis occurs at varying intervals following initial or secondary surgical intervention. Although it may occur as a primary complication, it more frequently occurs in combination with other surgical complications. Early recognition and extremely intensive treatment of post-

operative parotitis minimize the morbidity associated with this complication.

SUMMARY

Postoperative parotitis is reappearing as a not uncommon and extremely serious complication of surgery. Its reappearance is thought to be related to the increasing number of carriers of antibiotic-resistant micrococci (staphylococci) found in every hospital community. Measures designed to prevent this complication have been discussed, and its treatment as carried out at this hospital has been illustrated by brief reports of seven cases. The early diagnosis of surgical parotitis has been found to be highly important in the successful treatment of this complication.

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GOOD THERAPEUTIC TOOLS

"Physicians who are not psychiatrists can do a great deal in helping patients in the psychological aspects of illness if they are aware that, fundamentally, sympathy, considerateness, respect, support and understanding are, as they always have been, therapeutic tools of the greatest effectiveness."

—KENNETH E. APPEL, M. D.
in *Journal of the Medical Association of the State of Alabama*
p. 76, Oct. 1957

EXFOLIATIVE CYTOLOGY IN THE DETECTION OF PELVIC MALIGNANCY

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ALTHOUGH vaginal and endocervical smears have been used for hormonal phasing in endocrine and menstrual problems and as an adjunct in the diagnosis of trichomoniasis and moniliasis, their greatest and most undisputed value is in cancer detection.[1-4] With this in mind, we have analyzed the cytological smears obtained at this hospital from 13,501 patients during the two-year period from 1 January 1954 to 1 January 1956.

It has long been a policy in this hospital that all of our female outpatients and inpatients must have cytological smears taken at the time of examination, whatever the presenting symptoms. The swab technic is employed, using cotton-tipped applicators to take endocervical and vaginal smears. After these patients are examined, they are advised to have a routine examination every six months, at which time cytological smears are again taken. This accounts for many repeat negatives, because the same patient may have several negative reports.

The situation in the military is unique. We have no fixed patient load, nor do we draw patients from any particular geographic area; thus, many of our cancer patients are not seen initially by us, but are referred from installations and posts throughout the United States as well as from overseas. Therefore, we cannot state that we have a certain cancer detection rate per thousand patients.

In this study, all cytological smears were made by technicians who were unaware of the clinical or referred pathologic diagnosis. This obviated the possibility of a prior diagnosis influencing the technician's interpretation of the smear.

The classes of cytological smears and their significance are listed in table 1. On our service, Classes III, IV, and V are considered positive, obligating us to make further diagnostic

From Walter Reed Army Hospital, Walter Reed Army Medical Center, Washington, D. C.

studies. Of 13,501 smears taken, 260 were positive, an incidence of 1.92 per cent. It is our purpose to analyze the classification diagnoses and to correlate each classification with its corresponding tissue diagnosis. The Class III smear, although cytologically negative, is significant enough to be considered clinically positive.

TABLE 1. *Classification and interpretation of Papanicolaou smears*

Class	
I	Epithelial cells seen are normal for the patient's age, menstrual history, and clinical findings.
II	Some atypical cells are seen which are associated with non-neoplastic conditions, such as parasitic and bacterial inflammations. A repeat smear is usually requested when the infection has cleared.
III	Borderline changes are seen in cells which may be due to severe infections or malignancy. The common denominator is a more precipitous maturation and proliferation of the epithelium in the process of which atypical cells may appear.
IV	An element of doubt still persists because of an occasional highly atypical cell having malignant characteristics. We wish to emphasize that the term "malignant characteristics" is a descriptive one and that exfoliated cells having such characteristics are not invariably associated with malignant neoplastic disease.
V	Groups or clusters of markedly atypical hyperchromatic cells are seen which show the required cytological criteria for malignant cells and which, on comparison, are indistinguishable from proven cases of malignant neoplastic conditions.

RESULTS

Class V. Table 2 shows that of the 260 positive smears, 147 were Class V. The distribution of diagnoses is also shown in this table. On tissue examination, 127 of the Class V smears (86.4 per cent) proved to be malignant, whereas 20 were false positive, although abnormal tissue was present in 19 of these. A review of the cytology slides, taken before biopsy studies, showed that in the one patient in whom the cervix was reported to be normal, the offending agent was trichomoniasis—a case severe enough to produce cellular changes which would result in a Class V smear. There was a false positive rate of 13.6 per cent in the Class V Papanicolaou smears.

Class IV. Although the number admittedly is small, there were 33 Class IV smears, of which 13 were confirmed and 20 were not. Their distribution is shown in table 3. In Class IV smears there was a false positive rate of 60.7 per cent.

TABLE 2. *Diagnoses based on examination of tissue in 147 patients with Class V smear*

Class V (positive)		Class V (false positive)	
Squamous cell cancer of cervix	79		
Cancer *in situ*	26		
Adenocarcinoma of endometrium	12		
Adenocarcinoma of cervix	7	Cervicitis	12
Cancer of ovary (secondary)	1	Squamous metaplasia	3
Cancer of vagina (primary)	1	Cervicitis with basilar hyperplasia	4
Choriocarcinoma (secondary)	1	Normal	1
Total	127		20

TABLE 3. *Diagnoses based on examination of tissue in 33 patients with class IV smear*

Class IV (positive)		Class IV (false positive)	
Squamous cell cancer of cervix	7	Cervicitis	9
Cancer *in situ*	4	Squamous metaplasia	6
Adenocarcinoma of endometrium	1	Cervicitis with basilar hyperplasia	3
Adenocarcinoma of cervix	1	Leukoplakia	1
		Squamous papilloma in pregnancy	1
Total	13		20

Class III. There was a total of 80 Class III smears. Twenty of these led to the diagnosis of malignancy and 60 were considered to be false positive (table 4). The false positive rate for the Class III smear was 75 per cent.

Table 5 is a composite of the foregoing material. From this table it is apparent that if one were to use only Class V smears when speaking of positive Papanicolaou smears, the incidence of false positives would be low because of the relative certainty with which this class has a tissue diagnosis of malignancy. On the other hand, while still begin considered positive, the Class III and IV smears do not have as high an incidence of malignancy.

When evaluating the results of vaginal cytology, one is impressed by the fact that its main use is in the detection of unsuspected carcinoma.[5, 6] With this in mind, we reviewed all car-

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TABLE 4. *Diagnoses based on examination of tissue in 80 patients with Class III smear*

Class III (positive)		Class III (false positive)	
Squamous cell cancer of cervix	9	Cervicitis	41
Cancer *in situ*	6	Squamous metaplasia	13
Adenocarcinoma of endometrium	3	Cervicitis with basilar hyperplasia	2
Adenocarcinoma of cervix	0	Leukoplakia	2
Cancer of ovary (secondary)	1	Normal	1
Bowen's disease of vulva	1	Endocervical polyp	1
Total	20		60

TABLE 5. *Summary of cytologic interpretation*

Class	Total number	Correct diagnosis		False positive	
		Number	Per cent	Number	Per cent
V	147	127	86.4	20	13.6
IV	33	13	39.4	20	60.6
III	80	20	25.0	60	75.0
Total	260	160	61.8	100	38.2

cinoma *in situ* cases in this two-year period and the preceding three years, to determine the number of cases detected solely by the Papanicolaou smear.

In the clinical evaluation of the 84 patients on initial examination, 37 cervices were classified as normal in appearance and 32 showed erosion. Of the remainder, diagnosis is not known in 7, while there was leukoplakia in 2, granulation in 2, easy bleeding in 2, necrosis in 1, and a polyp in 1. Of the 37 patients with cervices initially classified as normal, 3 were diagnosed and treated elsewhere. Papanicolaou smears from the remaining 34 showed 23 to be Class V, 6 Class IV, and 5 Class III.

We believe that these 34 cases exemplify the efficacy of Papanicolaou smears as a routine screening procedure in the detection of unsuspected cervical cancer. If, for instance, one or two quadrant biopsies had been made for screening purposes in these cases, the area from which the biopsy specimen was taken would not necessarily have coincided with the actual cervical lesion. The material from a Papanicolaou smear represents a large surface and thus is more effective as a screening procedure.

SUMMARY AND CONCLUSIONS

A review of the positive cytological smears seen during a two-year period has been presented. In correlating the probability of malignancy as determined by cytological smear with the corresponding tissue diagnosis, we have shown that nearly 9 out of 10 patients with a Class V smear will have some type of genital tract malignancy, while in those patients with a Class IV smear, the incidence drops to 4 out of 10, and in those with the Class III smear, to 2 or 3 out of 10. A five-year study of carcinoma *in situ* revealed 34 instances in which a positive smear was the initiating step in establishing an altogether unsuspected diagnosis. Exfoliative cytology is not a diagnostic tool *per se*, but it is a screening aid which warns the physician that further diagnostic procedures are necessary.

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THE CARDIAC PATIENT FOR SURGERY

"The clinician who evaluates a cardiac patient for surgery must first be convinced that there is a clear indication for operation, must study the cardiac status, and must estimate the operative risk. Once evaluation is complete and diagnosis made, a plan of management for the preoperative period, the actual operative procedure, and the immediate postoperative period can be outlined. In a number of instances, patients with heart disease have coexistent conditions that necessitate surgical intervention. Many procedures, however, should be deferred until the physical condition permits operation with minimal risk."

—MAURICE G. DERANEY, M. D.
CHARLES A. R. CONNOR, M. D.
in *Heart Bulletin*
p. 65, July-Aug. 1957

CIRCULATING WHITE BLOOD CELL VOLUME IN LEUKEMIA

Preliminary Report

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A NUMBER of laboratories have reported[1] that the red blood cell count and hematocrit may not be adequate indications of the status of an anemia. In multiple cases, the red cell volume, as determined by the use of cells labeled with radioactive chromium, has given a more reliable estimate of the space occupied by erythrocytes. Because of this, our attention was directed also to the white blood cell volume in comparison to the leukocyte count, and its alterations in leukemia.

One criterion employed for following the progress of leukemia is the peripheral white cell count (number of WBC/μl). The end point of various therapeutic regimes has been a reduction of the white cell count to the "normal range" (generally under 10,000/μl). There is, however, little available information as to the response of the entire circulating white cell volume. On the basis of preliminary calculations herein reported, a normal value for the circulating white cell volume is established and changes during leukemia are documented. Possible use of this parameter in evaluating the response of intravascular leukocytes during the phases of leukemia is discussed.

METHODS

Two technics for determining the white cell volume were investigated:

Red Cell Labeling. Red blood cells were tagged by the use of radiochromium (Cr^{51}).[2] Fifteen ml of venous blood were added to a sterile, rubber capped tube that contained both heparin and

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50 microcuries of Cr^{51} in the form of $Na_2Cr^{51}O_4$. After gentle inversion, the tube was incubated at 37°C for 45 minutes. Plasma was withdrawn after centrifugation, and addition of sterile saline brought the volume to its original value. The washing was repeated twice and saline again added to reconstitute the volume.

Red blood cells are labeled with Cr^{51} by this technic. Leukocytes also take up the radioactive tag.[3] In normal individuals this presents no problem, because white cells occupy a volume of only about 10 ml (0.14 ml/kg of body weight; table 1) as compared with a total blood volume of 5,000 ml (71.5 ml/kg). In leukemia, the white cell volume is increased and the binding of radiochromium by leukocytes becomes a significant percentage of total Cr^{51} uptake. In order to avoid this, whole blood from leukemic patients was tagged with Cr^{51}, but only erythrocytes were used for reinjection into the donor. This was accomplished by discarding the upper "buffy" coat and washing the remaining red cells as discussed above. Three ml of the washed cells were kept as a standard and three were injected into the patient. Twenty minutes later, venous blood was withdrawn into a tube wetted with heparin, and a small quantity was employed in determining the hematocrit.

TABLE 1. *Calculation of normal white cell volume*

	Number per μl	Average radius in microns	Average volume in cubic microns	Product of number cells × radius^3
Red blood cell	5,000,000	3.7	$\frac{4\pi}{3} \times 50.7$	2.53×10^8
White blood cell	5,000	6.0	$\frac{4\pi}{3} \times 216.0$	1.08×10^6
Ratio RBC/WBC	$\frac{1,000}{1}$	$\frac{0.61}{1}$	$\frac{0.23}{1}$	$\frac{234}{1}$

$\frac{\text{Volume RBC}}{\text{Volume WBC}} = \frac{234}{1}$ If RBC volume is 2,500 ml, WBC volume is $\frac{2,500}{234}$ or 10 ml.

10 ml/70 kg body weight = 0.143 ml/kg.

Three ml of the sample were counted in a well-type scintillation counter, background corrected, and compared with the activity in the 3 ml standard:

$$\text{total blood volume} = \frac{\text{(corrected counts in standard) x 3}}{\text{corrected counts in 3 ml sample}}$$

white cell volume = total blood volume x leukocrit; or
white cell volume = total volume - (red cell and plasma volume).

White Cell Labeling. Leukocytes, both normal and abnormal, bind radioactive chromium.[3] In theory, it should be possible to incubate white cells with $Na_2Cr^{51}0_4$, wash to remove unbound Cr^{51}, and use the tagged cells in determining the leukocyte volume by the dilution principle. In practice, however, leukocytes are fragile and saline washing traumatizes the cells, as observed under the microscope. White cell labeling appears to be the more direct approach, but stabilizing materials, such as proteins, may have to be employed in the tubes to protect the leukocytes. Because of this, the red cell labeling technic was employed in the clinical cases.

CASE REPORTS

Case 1. A 57-year-old Causcasian man was first admitted to the hospital 2 years prior to the present study, because of generalized weakness and pain in the left upper abdominal quadrant. Splenomegaly was present. Peripheral blood cell counts and bone marrow aspiration established a diagnosis of chronic lymphatic leukemia. Hemoglobin was 7 grams/100 ml, platelet counts were within normal limits, and the white count varied from 240,000 to 310,000/μl.

Initial treatment was with irradiation of the spleen, and at the time of this study the patient was given therapeutic doses of radiophosphorus. Plotted in figure 1 are the peripheral white count and the white cell

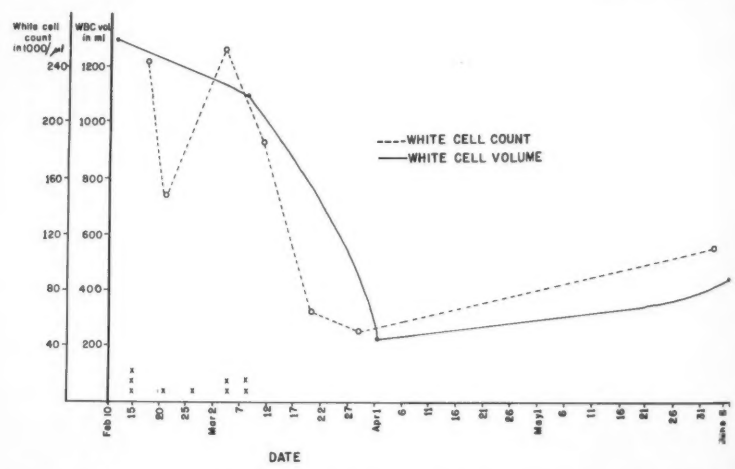

Figure 1. White blood cell count and white cell volume in case 1 (chronic lymphatic leukemia). Each x represents 1 millicurie of P^{32} used in therapy.

volume as determined by the red cell technic. Each x refers to 1 millicurie of P^{32} used in treatment. The initial white cell volume was 1,250 ml (21.9 ml/kg, as contrasted with a normal value of 0.14 ml/kg). The

total blood volume was 5,400 ml (95 ml/kg), and the red cell volume was 950 ml (17 ml/kg). During therapy, the white cell volume decreased to 225 ml (3.9 ml/kg). The total blood volume was 5,200 ml (91 ml/kg), and the red cell volume was 1,650 ml (29 ml/kg).

Case 2. A 43-year-old Caucasian man was admitted from another institution after a diagnosis of chronic granulocytic anemia had been established (white count 189,000/μl, bone marrow sample confirmatory). His initial complaints had been bleeding from the gums and night sweats. Splenomegaly and hepatomegaly were present. Hemoglobin was 11.5 grams. The platelet count and coagulation studies were normal. Initial white cell volume was 675 ml (9.9 ml/kg). Total blood volume was 5,100 ml, of which the white cells represented 13 per cent. This can be compared with a normal situation in which white cells occupy 0.2 per cent of the blood volume. Following a total of 11 millicuries of P^{32} over a 2-month period, the white cell volume decreased to less than 1 ml/kg, and the white cell count fell to 8,800/μl.

DISCUSSION

Numerically, white blood cells are only about one thousandth as abundant as red cells, but their volume, cell for cell, is nearly four times greater (table 1). In leukemia, the increased number of cells of the leukocyte series expands the white cell volume. Also, the abnormal leukocytes may have a volume quite different from normal cells. Hence the white cell volume may not increase in direct proportion to the leukocyte count.

In case 1, the white cell volume was 21.9 ml/kg, or 153 times greater than normal. Considering the magnitude of this figure, it is not surprising that white cells may aggregate in leukemia.

The white cell volume generally paralleled the peripheral white count in the two cases presented. This is to be expected if the blood volume and average cell size remain unchanged. Alterations in either factor probably would result in discrepancies between the number of white cells per unit volume and the total volume of cells within the vascular tree. The picture is complicated in that many leukemic cells probably reside outside of the circulating blood and pass back and forth. It will be of interest to follow the circulating white cell volume in "aleukemic" phases and in the fulminating disease occasionally encountered in children.

Tagging of leukocytes appears to be the more direct approach in estimating the white cell volume. Although white cells accept the tag, they are fragile and often are damaged during the subsequent washing. One advantage of direct labeling of leukocytes is the fact that only small quantities of radioactive material are introduced into the body, and this can be readily cleared as white cells are broken down. When labeled erythrocytes are employed, their long survival makes repeated determinations of the blood volume a difficult task.

SUMMARY

Determination of white blood cell volume by the use of radiochromium was accomplished by labeling red cells (Cr^{51}) and determining the white cell volume from the difference between total volume and red cell plus plasma volume. Specific labeling of white cells is possible but has serious limitations. The normal white cell volume of a 70-kilogram individual was calculated on the basis of cell size to be 10 ml (0.15 ml/kg). In a patient with chronic lymphatic leukemia, the volume was 1,250 ml (21.9 ml/kg). This fell to 225 ml during therapy with phosphorus 32 (P^{32}). A patient with chronic granulocytic leukemia had a white cell volume of 675 ml (9.9 ml/kg), which decreased to normal following therapeutic doses of P^{32}. White cell volume generally paralleled the peripheral white cell count, but there are possible causes of discrepancy and the use of this parameter in following the course of leukemia deserves further study.

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"There can be no doubt that the hypoglycaemic sulfonamides will lower the blood sugar in many mild, stable, middle-aged diabetics . . . . But the action of these compounds differs from that of insulin, and although they may lower the blood sugar they need not necessarily correct the other metabolic disturbances of diabetes."

—in *British Medical Journal*
p. 466, Aug. 25, 1956

CLINICAL USE OF DIPHEMANIL METHYLSULFATE AS AN ANTIPERSPIRANT

VICTOR R. HIRSCHMANN, *Colonel, MC, USA*
FRANK H. URBAN, *Captain, MC, USA*

PRANTAL (brand of diphemanil methylsulfate) has been administered orally or topically in the treatment of various dermatologic conditions.[1-4] The results in control of sweating, contact dermatitis (dermatitis venenata), pruritus, urticaria, and dyshidrotic eczema generally have been favorable.

This report concerns the use of Prantal in concentrations of 2 per cent and 5 per cent in an inert powder vehicle for control of sweating alone and of diseases in which sweating accentuates an existing dermatitis. Ointment vehicles often tend to aggravate dermatologic disease, especially in tropical climates, through their heat-retaining and macerating effects.

The exact mode of action of Prantal when used locally is not known, but it is believed that sufficient absorption takes place locally for it to act as an anticholinergic within the cutis, presumably by an effect on the most terminal cutaneous synapses of the parasympathetic nervous system. Certainly none of the systemic parasympathetic effects that would be expected from systemic absorbtion, such as dryness of the mouth, dilation of the pupils, flushing, and diminished generalized body sweating, were encountered.

MATERIAL

Sixty patients with various diseases of the skin in which primary or contributory factors were considered to be sweating, were investigated. Fifteen other patients were lost to observation and are not included in this study. Concentrations of 2 per cent and 5 per cent Prantal were applied two to three times daily to affected areas without regard to type, location, or severity of the disease. Paired comparisons of 2 per cent and 5 per cent concentrations, commenced early in the study, were discontinued because many of the patients became confused as to

From Gorgas Hospital, Panama, Canal Zone. Prantal powder was supplied by the Clinical Research Division, Schering Corporation, Bloomfield, N. J.

the side on which each was used. Controls were not used, except insomuch as all of the patients had previously had no success with other topical agents prescribed for control of sweating. Concomitant treatment consisted in the use of antibacterial or antifungal agents when indicated, but in no case were these agents considered to interfere with evaluation of the efficacy of Prantal powder.

Because all patients were within a tropical climate throughout the course of study it is thought that the effect of the agent in reducing perspiration was subjected to rigid evaluation. Although the temperature in the Canal Zone is not unduly high, ranging from 74° to 94°F, the humidity is extremely high throughout the entire year. Relative humidity ranges from 65 to 95 per cent and rarely is less than 90 per cent at some time during the day.

RESULTS

Results are shown in table 1. They were considered excellent if the patient obtained total relief or relief of such degree that the sweating component was no longer a major or significant

TABLE 1. *Comparative effect of 2 per cent and 5 per cent Prantal powder in treatment of 60 patients with various dermatologic conditions related to sweating*

Diagnosis	Total		Therapeutic response					
			Excellent		Fair		Poor	
	2 %	5 %	2 %	5 %	2 %	5 %	2 %	5 %
Hidradenitis suppurativa	1	3	0	2	1	1	0	0
Hyperhidrosis of feet	2	16	0	13	1	2	1	1
Dermatitis venenata (crural and axillary)	3	5	1	3	1	1	1	1
Neurodermatitis circumscripta	2	1	1	1	1	0	0	0
Pruritus of anus and scrotum	1	3	0	1	0	1	1	1
Intertrigo (crural)	5	5	3	2	2	2	0	1
Intertrigo (axillary)	1	6	0	4	0	2	1	0
Miliaria rubra	3	3	1	2	1	0	1	1
Total	18	42	6	28	7	9	5	5

complaint; fair, if only partial control of sweating was obtained or if this complaint persisted to a minor degree; and poor, if there was little or no relief. No side effects were observed, and either excellent or fair results were obtained with 50 (83 per cent) of the 60 patients treated for various dermatologic conditions; however, results with 5 per cent Prantal powder were

appreciably better than with 2 per cent. Of 18 patients treated with 2 per cent Prantal powder, 13 (72 per cent) showed excellent or fair results, whereas such results were obtained with 37 (88 per cent) of 42 patients who were treated with 5 per cent powder.

SUMMARY

Prantal (brand of diphemanil methylsulfate) in a talcum-powder vehicle for topical application to the skin, has proved to be of value in a tropical area in controlling sweating in a significant number of dermatologic cases in which the sweating component was a significant factor or the major factor in producing symptoms. A 5 per cent concentration proved to be distinctly more effective than a 2 per cent concentration.

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MILITARY PREVENTIVE MEDICINE IN 1777

On February 5, 1777, Washington wrote to Congress from Morristown, that

"The small pox has made such head in every quarter that I find it impossible to keep it from spreading through the whole army in the natural way. I have therefore determined not only to inoculate the troops now here that have not had it, but shall order Dr. Shippen to inoculate the recruits as fast as they come to Philadelphia. They will lose no time because they will go through the disease while their clothing, arms, and accoutrements are getting ready."

—FRANCIS RANDOLPH PACKARD
in *The History of Medicine in the United States*
published by J. B. Lippincott Co.,
Philadelphia, Pa., 1901
pp. 283-284

PIONEERING IN COLOR TELEVISION EDUCATION

RICHARD R. BLOOM, *Sergeant First Class, USA*

ARMY medical leaders always have been active in developing new and better methods of diagnosis and treatment, and in seeking better ways to impart new findings and developments to Army doctors throughout the world, in order to keep them at the peak of professional competence. The Television Division of Walter Reed Army Medical Center was established as a training and educational medium to help accomplish this mission. The television camera has made possible the simultaneous viewing by large audiences of operating-room procedures or of material under a microscope. It has enabled a group of dental specialists to assemble and witness new dental technics, even those involving fine details of a single tooth.

As the hub of Army medicine, this medical center was chosen as the obvious location for the Army's development of educational television facilities. Walter Reed Army Institute of of Research is the focal point of medical, dental, and veterinary research projects and postgraduate programs within the Army. The Army Prosthetics Research Laboratory is constantly developing new methods to decrease the physical disability of the amputee. The Central Dental Laboratory performs a similar function in the field of oral prosthetics, as well as performing an extensive teaching mission. Also located here is the Armed Forces Institute of Pathology (AFIP). A closed-circuit compatible color television system was decided on as best suited for the requirements of the Army Medical Service, and installation was completed by the Radio Corporation of America in the fall of 1956. Since that time improvements have been made continuously, and more are foreseen.

THE MAIN STUDIO

Operating on a three-channel network, the Television Division has three studios, each with its own control system. The main studio (fig. 1) in the AFIP building is the nerve center of the system. In addition to controlling dissemination of programing from all cameras in the AFIP building, the main control room can co-ordinate a single program originating from all studios on

From Public Information Office, Walter Reed Army Medical Center, Washington, D. C.

all three or any one channel. In appearance, this studio resembles that of any major TV network. Since medical instruction often involves documentary subjects, there are facilities for the con-

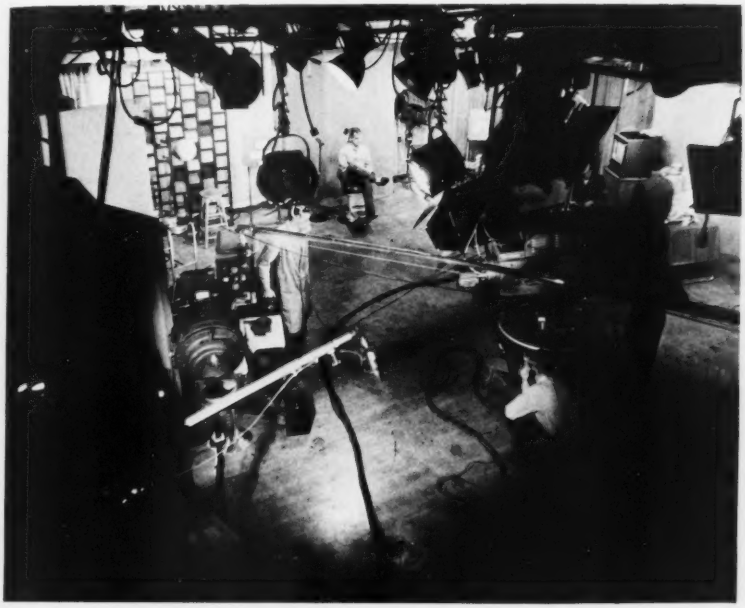

Figure 1. Main studio during a recent production that involved a variety of demonstrations, each one represented by small sets shown here arranged across one end of the studio facility.

struction of any desired setting or scenic background. Walter Reed TV viewers have seen hospital wards, plush conference rooms, and battleground scenes originate from this studio.

The main control room (fig. 2) directly controls five color cameras in the AFIP building. Two cameras on the studio floor cover any lecture or documentary program televised from there.

TV FILM CAMERA

In the main studio area is the film camera system. This consists of a color television camera which, through a reflector system, picks up images from a 16-mm motion picture film projector, a 2- by 2-inch slide projector, and a 3- by 4-inch slide projector. These can transmit in color or in black and white. This equipment can be operated either locally or remotely from any one of the three studio control rooms, thus allowing motion picture or film slides to be included in any live program being shown from any studio.

Figure 2. Room from which five color camera heads are controlled, three being shown in operation. This room also houses encoding systems, test instruments, remotely controlled switching relays, and three VHF transmitters which feed the Center's extensive coaxial distribution network.

TV MICROSCOPE CAMERA

One of the most unique pieces of equipment in the division is the color TV microscope camera mount (fig. 3) designed by the Television Division in co-operation with RCA engineers and built by the Biophysical Instrumentation Division of the Walter Reed Army Institute of Research. This system permits enlarged color reproduction on a TV screen from several types of standard microscopes, enabling numerous scientists to observe, study, and discuss micro-organisms without taking turns viewing through a microscope. The entire assembly is mounted on rubber-tired casters, allowing it to be set up quickly wherever cable terminals are installed.

OPERATING ROOM CAMERA

In one of the operating rooms, a ceiling-mounted color TV camera (fig. 4) conveys close-up views of surgical operations to Walter Reed students. The lens of this camera views the operating field via a mirror which reflects the surgeon's working area through a hole in the center of a light focused on the area. This camera mount can be turned a full 360 degrees and the

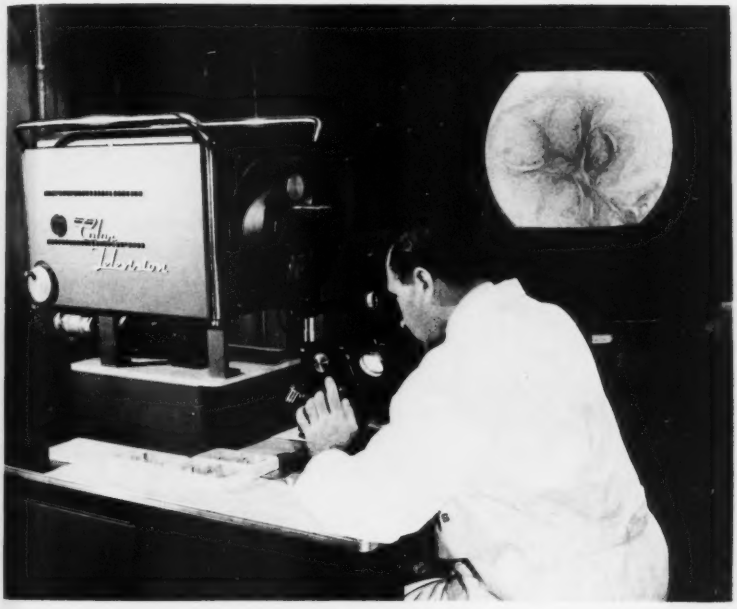

Figure 3. This color TV miscroscope is completely new to the television industry. Light passes through the microscope and engages a beam-splitter which directs a sufficient amount of light to the microscopist's eye to permit him to examine suspect tissue just as though television were not involved. The remaining amount of light passes directly through the beam-splitter and is reflected through a prism into a three-vidicon color television camera of special design.

camera can be moved on runners the length of the mount, thus exposing all working areas in the room to view. In addition, remote control of this camera eliminates the necessity for a television technician's presence in the operating room and prevents any interference with the surgeon. Seated in the control room, an operator can focus the camera, select and change its lens, and follow action with tilt and pan controls.

AUTOPSY SUITE CAMERA

Similar to the operating-room camera is another ceiling-mounted camera in the McNabb Autopsy Suite at the AFIP. Thanks to this camera and its sister in the operating room, the difficulties of the operating-room theater have been overcome. No longer is it necessary for a student to attempt to peer through the backs of operating-room personnel or from a long distance, in order to glean some knowledge from the operation. Now he can sit in an auditorium or conference room and let television bring him a high-quality color image of the operating area, while the surgeon or

pathologist lectures through a microphone inserted in his surgical mask.

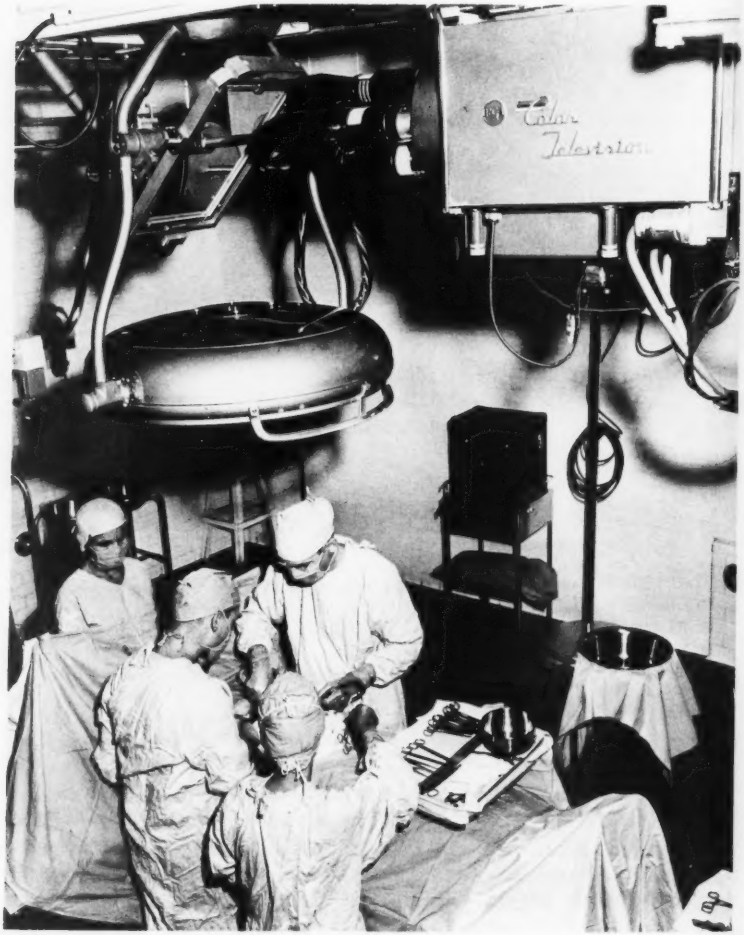

Figure 4. Color television camera in operating room, equipped with a turret of lenses of varying focal length. The camera looks at the surface of a mirror that is suspended at an angle above an aperture within the center of the operating light, which always is focused on the operating field.

SURGEON-PATHOLOGIST LIAISON

The operating room and autopsy suite cameras along with the TV microscope camera aid medical science. It is standard practice for a surgeon to send from the operating room to the

pathology laboratory through a pneumatic tube certain tumors or diseased tissues removed from a patient. The pathologist examines the tissue and determines whether or not there is a malignant condition present. He then telephones the operating room and gives the surgeon the results of his analysis. With the aid of television, the pathologist can televise microscope slides of the tissue to the operating room and discuss it with the surgeon. He can also see the operating area himself, since all this is done before the operation is completed.

WRAIR CAMERAS

Two floor cameras in the Walter Reed Army Institute of Research studio facilitate programing from that building. Most dental surgery demonstrations are televised from here, as well as many programs on research and postgraduate education. By means of a telescopic lens on the camera, a single tooth can be enlarged many times to fill the entire 6- by 4-foot TV projector screen. One of these cameras can be moved anywhere in the building where cables are installed, and is sometimes moved to the hospital to back up the surgical camera there.

TV PROJECTOR

When large audiences are assembled in Dart Auditorium at AFIP, Sternberg Auditorium at the Research Institute, or in the post theater, they watch live color television as it is projected onto a 6- by 4-foot screen by one of the Division's two TV projectors. While throwing an image larger than can be viewed on a normal television receiver set, the projector loses none of the superior picture quality of the television screen and can be viewed by as many persons as can comfortably watch a moving picture projection.

TRINESCOPE

Medical officers stationed at Army posts throughout the world can keep abreast of the latest advances in scientific knowledge through films taken by the TV Division's color-kine recorder, known as the trinescope. This machine photographs live color programs on 16-mm motion picture film in the same high quality that appears on the television screen. Thus, any military medical installation that has access to a motion picture projector can receive the advantage of lectures, demonstrations, and courses given by some of the world's foremost medical authorities.

PAST PROGRAMS

With this wealth of equipment, the 50 civilian and military members of the Television Division have aired over 100 programs since July 1956. These included not only shows and demonstrations viewed locally over the Walter Reed closed-circuit, but also many piped to downtown locations in Washington and one

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to New York City. The latter was a two-hour dental demonstration micro-waved to a meeting of the Greater New York Dental Society. Recently, Walter Reed scientists presented professional papers to members of the Medical Society of the District of Columbia at Washington's Statler Hotel over closed circuit television emanating from Walter Reed. Medical men attending the October meeting of the Association of Military Surgeons of the United States saw live television demonstrations over Walter Reed's TV facilities. Working with the University of Maryland, the Division is producing a series of advanced mathematics courses for teachers in various parts of the District of Columbia and nearby Maryland areas. The cost of transporting such programing off post is borne by the organization receiving the program.

MISSION AND PROSPECTS

To quote Dr. Paul W. Schafer, Executive Director of the WRAMC Television Division, "All who have training and education responsibilities are concerned with a continuing shortage of qualified teachers. There are just not enough to go around, this being no less true in medicine than in the field of education generally. Simple quantitative approaches to this problem have not reduced our continuing deficiency. It appears that something new, something qualitatively different is needed. The Television Division of Walter Reed Army Medical Center is dedicated to the thorough exploration of the training and educational potential of our most powerful means of audio-visual communication—color television."

EMOTION AND GI LESIONS

"Not only functional disorders but also gross organic lesions in the gastrointestinal tract can be caused by emotional stimuli. The functional disorders include nervous vomiting, anorexia nervosa, nervous diarrhea, constipation, and irritable colon. The disturbances of function may lead to the organic lesions, of which good examples are peptic ulcer and chronic ulcerative colitis. Such problem cases require study and treatment of the total organism and may necessitate consultation between social service department, psychiatrist, and internist."

—LOWELL D. SNORF, M. D.
in *Journal of American Medical Association*
p. 857, Oct. 27, 1956

HERNIA OF MORGAGNI ASSOCIATED WITH HIATAL HERNIA

ROMULUS L. MAY, *Captain, MC, USN*
JOSEPH J. TIMMES, *Captain, MC, USN*

HERNIA through the foramen of Morgagni is a relatively uncommon condition, slightly more than 100 cases having been reported in the literature. Harrington[1] encountered only 4 cases in a series of 270 diaphragmatic hernias of various types. The combination of an esophageal hiatal hernia with a hernia of Morgagni must be rare. To our knowledge the only reported case is the one presented by Harrington[2] in 1941; however, the retrosternal hernia did not contain colon, only omentum being present. Our recent experience with a case of esophageal hiatal hernia combined with a Morgagni hernia that contained colon prompted this report. Furthermore, during the past few months we have encountered two additional cases of simple Morgagni hernia, and these will be summarized briefly.

CASE REPORTS

Case 1. A 62-year-old woman had been seen in the clinic at this hospital for four months prior to admission on 9 September 1957. There were multiple complaints, and an element of hypochondriasis was first suspected. The patient's chief symptoms were dizziness, retrosternal and epigastric distress, especially after meals; nausea; infrequent vomiting; chronic cough, occasionally productive of small amounts of yellow sputum; and intermittent pain over the tip of the left scapula. She also complained of chronic constipation requiring laxatives every 3 or 4 days. She had lost about 23 lbs during the nine months prior to admission. Her past history was noncontributory.

The physical examination was essentially negative except for the presence of a mid-line surgical scar with some diastasis recti abdominis. Routine laboratory studies, an electrocardiogram, and a gallbladder series were within normal limits. A roentgenogram of the chest in the posteroanterior projection showed elevation of the diaphragm on the right and a large mass at the right cardiophrenic angle (fig. 1). The gastrointestinal series, utilizing the Valsalva maneuver and Trendelenburg position, demonstrated a large esophageal hiatal hernia. A barium enema demonstrated a loop of transverse colon entering the chest by way of the right retrosternal space (figs. 2 and 3).

From U. S. Naval Hospital, St. Albans, N. Y.

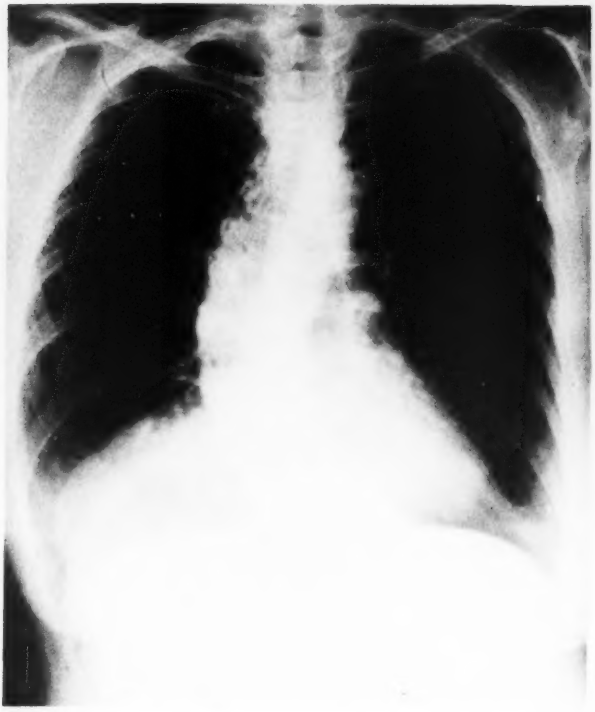

Figure 1 (case 1). Roentgenogram showing elevation of the diaphragm on the right and a large mass at the right cardiophrenic angle.

A diagnosis of Morgagni hernia with concomitant esophageal hiatal hernia was made, and an operation was performed on 12 September. Through a high left paramedian incision, a hernia of Morgagni containing a 20-cm loop of transverse colon, and a sliding hiatal hernia with a 6- by 6- by 8-cm gastric pouch were found. The two hernias were easily reduced and repaired, and the postoperative course was entirely uneventful. The patient was discharged on 21 September with complete relief of her symptoms.

Case 2. A 28-year-old man was admitted to this hospital on 27 May 1957 with a diagnosis of infiltration of the middle lobe of the right lung. The patient was essentially asymptomatic, and the "infiltrative lesion" in the right lung field at the cardiophrenic angle had been discovered on routine roentgenographic examination of the chest.

Physical examination and routine laboratory studies on admission were essentially negative. Roentgenograms of the chest revealed a

Figure 2 (case 1). Barium enema demonstrating a loop of transverse colon entering the chest by way of the right retrosternal space.

semispherical density, contiguous with the right cardiac border and measuring 8- by 5-cm in diameter (fig. 4). Fluoroscopy revealed that the mass did not pulsate. Inspiratory and expiratory films of the chest showed some change in size and configuration of the mass. A barium enema failed to demonstrate colon above the diaphragm. Bronchoscopy, blood volume measurements, pulmonary function tests, and an electrocardiogram were within normal limits.

On 28 June a right thoracotomy was performed and a hernia through the foramen of Morgagni was encountered. There was an 8- by 4-cm mass of omentum in the hernial sac, but it did not contain colon. The mass was reduced into the abdomen and the defect repaired with interrupted silk sutures. The patient's postoperative convalescence was uneventful and he was discharged to full duty on 17 July.

Figure 3 (case 1). Gastrointestinal series (utilizing the Valsalva maneuver and Trendelenburg position), demonstrating esophageal hiatal hernia; also, barium enema showing Morgagni hernia, with loop of colon in right retrosternal space.

Case 3. An 18-year-old man was admitted to this hospital on 19 July 1957 with a history of a productive cough. He had experienced an episode of shortness of breath while lying in bed, which he described as an "obstruction" in the lower chest that seemed to restrict his breathing. He also had noted substernal and epigastric distress not related to food intake. His past history was noncontributory.

Physical examination revealed a young white man in no acute distress. Routine laboratory studies were within normal limits. A roentgenogram of the chest in the posteroanterior diameter revealed a mass at the right cardiophrenic angle. Lateral chest films demonstrated a retrosternal mass about 4 by 3 cm in size (figs. 5 and 6). A barium enema was negative.

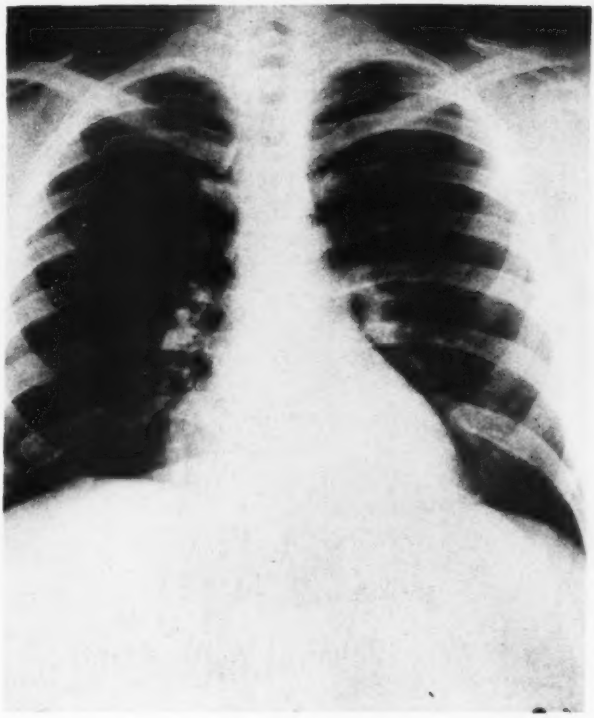

Figure 4 (case 2). Posteroanterior roentgenogram showing semispherical density contiguous with the right cardiac border.

On 29 August a right thoracotomy was performed and a small hernia of Morgagni, about 4 by 3 cm in diameter and containing only omentum, was found. The defect was easily repaired with several interrupted silk sutures. Postoperative convalescence was uneventful, and the patient was discharged on 13 September with no complaints.

DISCUSSION

The foramen of Morgagni is a triangular defect located in the anteromedian portion of the diaphragm. It is bounded by the posterior surface of the sternum and the sternal and costal diaphragmatic attachments. The space contains fatty areolar tissue and affords passage to the superior epigastric arteries. Hernia through the foramen is variously called Morgagni hernia, subcostosternal hernia, parasternal hernia, retrosternal hernia, retrocostoxiphoid hernia, and hernia through Larrey's spaces.

Morgagni hernias are considered to be the least common of all the diaphragmatic hernias. Basically they are of the direct type

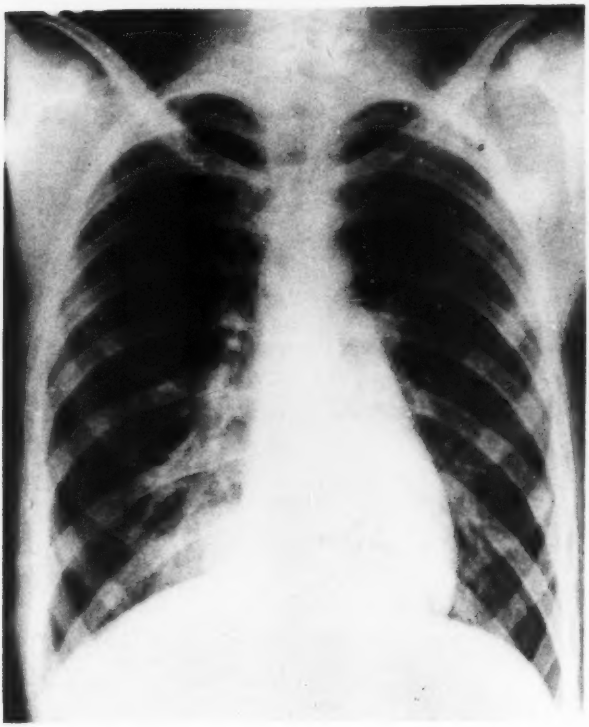

Figure 5 (case 3). Posteroanterior roentgenogram showing mass at the right cardiophrenic angle.

and contain a peritoneal sac. They generally are considered to be embryologic in origin, although the majority of cases reported have been noted in patients over 40 years of age. Presumably obesity and increasing intra-abdominal pressures function as precipitating factors. These hernias occur mainly on the right side, the left retrosternal space apparently being strengthened by the pericardium.

The symptoms are variable and range from minimum to rather severe, largely depending on what organ is included in the hernia. The most common organs involved are colon and omentum; infrequently, stomach, small intestine, or liver may be found. Strangulation may occur, but seems to be uncommon. Abdominal symptoms include indigestion, epigastric pain, eructations, nausea, vomiting, dysphagia, and chronic constipation. Gastrointestinal bleeding or signs of intestinal obstruction may be present.

Symptoms in the chest may result from compression of the lung, producing dyspnea, chronic cough, and hemoptysis. Interference

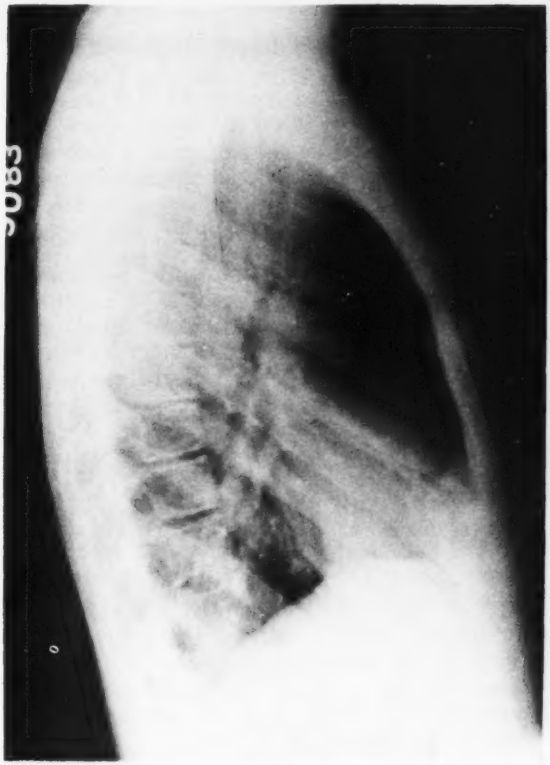

Figure 6 (case 3). Lateral roentgenogram showing retrosternal mass just above the diaphragm.

with normal cardiovascular function may cause shoulder pain, substernal pain, palpitations, and even cyanosis. The symptoms usually are aggravated by exertion or by assuming a supine position shortly after eating, and not uncommonly are relieved by vomiting.

The diagnosis of Morgagni hernia seldom is difficult if one is aware of this condition. Symptoms may simulate disease of any intra-abdominal organ or of the cardiorespiratory system. Routine roentgenographic examination of the chest usually will reveal a rounded cardiophrenic angle density that in lateral views is seen to be located retrosternally. This would suggest any one of a number of lesions, such as pericardial cyst, lipoma, teratoma, neoplasm of the lung, bronchial cyst, lymphoma, and encapsulated pleural fluid, but if colon is present in the hernia at the time

of the examination, haustrations may be seen or some type of intestinal pattern may suggest itself. A gastrointestinal series utilizing the Trendelenburg position and the Valsalva maneuver, may be helpful. A barium enema frequently will show colon located in the retrosternal space. Even if only omentum is present in the hernia, one may get the impression from a barium enema that the colon is being pulled cephalad. Induction of pneumoperitoneum and pneumothorax may be useful in diagnosis, in some cases.

The treatment of Morgagni hernia is surgical. It is generally believed that the transabdominal approach is superior to the thoracic approach. Not infrequently, however, a positive diagnosis can not be made preoperatively. In these cases thoracotomy is mandatory, the transthoracic approach usually posing no difficulty in repair of the defect. After the hernia is reduced, the excess portion of the sac is excised and small defects simply repaired with interrupted sutures overlapping the edges of the diaphragm. In large hernia, the anterior margin of the defect may be sutured to the anterior chest wall or to the posterior rectus sheath. Fascial grafts[3] or sutures have been used for repair, as have the round ligament and transversalis fascia.

SUMMARY

Three cases of hernia of Morgagni have recently been treated surgically at this hospital. In one of these cases there was an associated esophageal hiatal hernia. Such a combination must be extremely rare, only one case having been found in the literature. This case presented many symptoms, all of which were completely relieved by surgical intervention.

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COMPLICATIONS OF MECKEL'S DIVERTICULUM

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WILLIAM A. SNYDER, *Lieutenant Commander, MC, USN*
NORMAN V. COOLEY, Jr., *Lieutenant, MC, USN*

IT is the purpose of this article to describe the complications encountered in 41 cases in which Meckel's diverticulum was found during surgical procedures at this hospital in the 42-month period from January 1954 through June 1957.

Meckel's diverticulum, the commonest of a number of recognized abnormalities of the vitelline duct, results from incomplete obliteration of the duct, which in early fetal life connects the yolk sac with the intestine. Arising from the antimesenteric border of the ileum, usually less than 1 meter from the ileocecal valve, Meckel's diverticulum is said to occur in about 2 per cent of the population.[1] A definite familial incidence of this anomaly has been documented.[2] In one case in the present series, the patient's father earlier had required resection of such a diverticulum.

A diverticulum may be easily identified by its separate blood supply, the prominent omphalomesenteric vessels, which arise from the intestinal arcade and pass over the bowel out along the wall of the diverticulum to its tip. These vessels occasionally persist at their usual location in the absence of a grossly demonstrable diverticulum. Usually lined by intestinal mucosa, diverticula not uncommonly contain gastric, duodenal, pancreatic, or colonic tissue, alone or in combination.

In our patients, the diverticula varied from 1 to 20 cm in length, and the largest was 3 cm in diameter. They were located from 20 to 90 cm from the ileocecal valve.

COMPLICATIONS

A variety of complications may arise from this anomaly, most of the commoner ones being observed in the present series. When a fibrous remnant persists from the tip of the diverticulum to the umbilicus, a loop of intestine may become obstructed around it.

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The structure, if attached only at its base, may invert and form the leading point of an ileal intussusception. Torsion, obstruction, and gangrene of the entire structure can occur. The most frequently observed complications, however, are related to the presence of heterotopic tissue, notably gastric mucosa. This, by the action of acid and pepsin, forms a peptic ulcer in a portion of the diverticulum lined by intestinal mucosa or in the nearby ileum, with hemorrhage, perforation, or acute ulcerative diverticulitis.

Granulomas and neoplasms, benign and malignant, are reported. Nearly half of all patients with complications develop symptoms in infancy or early childhood. More than two thirds of all diverticula, as estimated from autopsy series, do not cause any symptoms or complications.

Of the 20 patients in our series in whom the primary disease was directly related to a Meckel's diverticulum, 14 had simple diverticulitis, 1 had volvulus with perforation, 2 presented intussusception with acute ulceration of the intussuscepting diverticulum, and 3 had uncomplicated volvulus without diverticulitis. Among the 17 cases of diverticulitis, there were 8 instances of ulceration. Of these, 4 were perforated, and in the other 4 there was a history of clinically significant bleeding.

In the total of 41 patients, 5 diverticula were not resected because of an acute surgical condition requiring treatment elsewhere in the abdomen. Gastric mucosa, present in 38.8 per cent of the 36 resected diverticula, was found in 10 (58.8 per cent) of the 17 cases with diverticulitis, including all 8 cases with ulceration, which either had bled or perforated.

CLINICAL FINDINGS

Five patients in whom Meckel's diverticulum was the site of pathologic lesions gave histories of prior gastrointestinal symptoms. Two complained of recurring nausea, vomiting, and abdominal pain for a year. One 11-month-old infant had repeated rectal bleeding over a three and one-half-month period. A seven-year-old child with a perforated ulcer in a diverticulum had had several bloody stools six weeks earlier. One patient with a small perforation gave a six-month history of intermittent right-sided abdominal pain.

The only constant symptom in all patients with acute illness related to Meckel's diverticulum was abdominal pain, the location and character of which varied with the nature of the lesion. The most usual physical finding was right lower quadrant abdominal tenderness, leading in eight cases to a preoperative diagnosis of acute appendicitis. In five cases the diagnosis of Meckel's

diverticulitis was made preoperatively; in four the preoperative diagnosis was intestinal obstruction due to postoperative adhesions; and volvulus, intussesception, and perforated viscus were each diagnosed once.

Laboratory examinations were of little aid in diagnosis. White blood cell counts ranged from 8,600 to 15,400 cells per μl. The lowest concentration of hemoglobin, 4 grams per 100 ml, occurred in a 4-month-old infant bleeding from an ulcerated diverticulum. Meckel's diverticulum was not demonstrated radiographically in any of our patients prior to operation.

Nine of our 41 patients had previous intra-abdominal operations, and 5 of these 9 were in the group of patients who developed complications related to their Meckel's diverticula. Appendectomy had been performed previously in four. One 38-year-old patient had undergone three previous laparotomies, including an appendectomy, a unilateral salpingo-oophorectomy, and removal of the other ovary and tube. At the time of her fourth operation, she was found to have a volvulus of the small bowel and omentum about a Meckel's diverticulum 15 cm in length with its tip adherent in the pelvis. Another patient with volvulus of small bowel about a band from a diverticulum had undergone laparotomy for a gunshot wound of the abdomen six years previously.

TREATMENT

Treatment of Meckel's diverticulum at this hospital during the three and one-half-year period varied with different surgeons. Of the 41 diverticula encountered, 5, as noted previously, were not resected. The remaining 36 were treated as follows: oblique resection of diverticulum, 14; longitudinal resection of diverticulum, 7; transverse resection of diverticulum, 6; transverse resection of diverticulum, including wedge of ileum, 5; resection of a short segment of ileum, including diverticulum, with end-to-end ileoileostomy, 3; and resection of terminal ileum (containing diverticulum) and right colectomy for lymphosarcoma of cecum, 1. Two of the short ileal resections were made necessary by the presence of gangrenous bowel incident to ileal intussusception. The third such resection was performed electively, and this case was of special interest because of subsequent anastomotic complication, the only such problem in the series. Of the 5 diverticula not excised, 4 were incidental findings. The fifth occurred in a patient who was convalescent from cervical laminectomy. He was moribund at the time of laparotomy, which was performed urgently for peritonitis caused by perforation of the cecum. The perforation had resulted from volvulus about a band leading from the abdominal wall to a noninflamed Meckel's diverticulum. Treatment consisted of lysis of the obstructing

band and exteriorization of the cecum. The death of this patient from sepsis constituted the single mortality of the series.

SURGICAL COMPLICATIONS

Apart from the postoperative death, which resulted from delayed diagnosis of volvulus of the cecum progressing to perforation before laparotomy, the only major complication was that of stenosis of the anastomotic site after a limited resection of ileum. This patient was originally explored after a period of observation during which time he had complained of vomiting and severe abdominal pain, and no gross intraperitoneal pathologic condition was discovered. Appendoctomy was performed and a large Meckel's diverticulum was excised incidentally. Postoperatively, there was persistent paralytic ileus with fever and a changing pattern of bizarre neurologic findings. The diagnosis of Guillain-Barré syndrome was considered. On the 14th postoperative day, gastrointestinal motility returned with evidence of mechanical small bowel obstruction. Re-exploration revealed stenosis at the site of previous anastomosis. After resection of the stenotic segment and re-establishment of intestinal continuity, the postoperative course was uncomplicated and the patient later returned to full active service. The one other instance of partial obstruction responded promptly to intestinal decompression and did not recur.

Four wound infections all occurred in cases of incidental diverticulectomy, three in association with appendectomy and one with lysis of adhesions for intestinal obstruction. Secondary paralytic ileus (three cases) responded in each instance to conservative measures.

DISCUSSION

The potential complications of Meckel's diverticulum have been known for more than 50 years, and our experience is not materially different from that of others who have written on this subject.[1-9] Intussusception due to invaginated Meckel's diverticulum in infants is not rare, and one of our cases occurred in a seven-month-old infant. In adults, intussusception occurs less frequently, and Ponka[10] stated that these patients often give a long history of recurring bouts of periumbilical pain, as in our other case of intussusception occurring in a 26-year-old man. Volvulus of bowel caused by a band between diverticulum and the abdominal wall occurs infrequently, and our finding only two cases in a three and one-half-year period confirms this observation.

The one death in this series resulted from a volvulus that went unrecognized beyond the time when successful treatment could have been instituted. The presence of gastric mucosa in these diverticula increases the danger of complications. The

finding of gastric mucosa in 38.8 per cent of our patients is a somewhat lower incidence than is reported in series comprised entirely of children, most of whom have been operated on for primary pathologic conditions in the diverticula. As adults enter the series, increasing numbers of incidentally excised, asymptomatic diverticula will dilute this percentage toward the figure of 20 per cent reported by Jay and associates[6] for specimens found incidentally at laparotomy.

All of our eight patients with ulceration, four with perforation and four with hemorrhage, were in the group showing gastric mucosa. In connection with this finding, Berman, Schneider, and Potts[11] believed that bleeding or rupture occur only when gastric mucosa is present. In none of our eight patients was ulceration found on the opposite ileal wall, as was found in patients of Smith and Woodward.[12] No pancreatic tissue was found in any of the diverticula of our series, and one noninflamed diverticulum was found to be lined entirely by normal colonic mucosa.

Five complications occurred in patients who had previously undergone one or more laparotomies, suggesting that a more careful search for Meckel's diverticulum needs to be made at the time of every abdominal procedure. In five other patients, a noninflamed diverticulum was found but not removed, because of an acute pathologic condition elsewhere in the abdomen. Jay and associates stated that in view of the fact that one in five of the specimens found incidentally at laparotomy contain gastric mucosa, all Meckel's diverticula should be removed on discovery. We would agree with the more conservative view of Baker and Marshall,[8] who believed that when a diverticulum is encountered in the course of an unrelated abdominal procedure, all other contingencies must be evaluated before excision of the diverticulum is added to the hazard of other intra-abdominal surgery. The presence of a narrow neck or of an adhesive band to the umbilicus is generally considered to be a strong indication for removal, whereas generalized acute inflammatory disease, a prolonged primary procedure, or the necessity of intestinal resection tend to contraindicate incidental diverticulectomy.

SUMMARY

Of 41 patients with Meckel's diverticulum, treated at this hospital over a three and one-half-year period, 20 had complications, such as intussusception, volvulus, or diverticulitis, the latter being associated with ulceration, bleeding, and perforation. In eight patients with bleeding, ulceration, and perforation, gastric mucosa was present in the diverticula.

Oblique resection of the diverticulum at its base is preferred when the adjacent ileum is normal, although occasionally seg-

mental resection of ileum and end-to-end ileal anastomosis is necessary. Serious complications due to Meckel's diverticulum occur with sufficient frequency to warrant removal of all diverticula when found incidentally, provided all other factors are evaluated before diverticulectomy is added to other intra-abdominal procedures.

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EDUCATION UNENDING: THE HERITAGE OF MEDICINE

DAN C. OGLE, *Major General, USAF (MC)*

AGAIN it is my privilege and an honor to address the civilian and military citizens of this community, as a representative of the United States Air Force and its medical service.

In contemplating the patriotic history of this area, I feel humble to stand on such ground, yet I am proud to have the opportunity of formally introducing this hospital to this community and to the great profession of military medicine and to dedicate its service to our country. The Air Force is fortunate in being so well established and so well received as it is here.

New U. S. Air Force Hospital, Lackland Air Force Base, Tex.

Few communities can boast of the brilliant, patriotic history that so endears Texas and San Antonio to the hearts of the American people. For 250 years this community has been a center of military and cultural development. Under various flags it has

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Presented at the dedication ceremonies of the new hospital, Lackland Air Force Base, Tex., 16 November 1957.

General Ogle is Surgeon General, United States Air Force.

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always been America, though not until 1845 did it come under the Stars and Stripes. For over one hundred years, the Alamo served as a center of religion, teaching, refuge, and inspiration; then on 6 March 1836 it became one of the outstanding inspirational shrines of American history and patriotism.

Much also can be said of the Cathedral of San Fernando, standing at the exact center of the 36 square miles of the city. Other missions, schools, cathedrals, and fortresses have contributed greatly to the picturesque and inspiring history of this State. This land and its many patriots are endeared to all the people of the United States as well as to you of Texas. It is known the world around that no one loves his native land more than a Texan. That is good. Theodore Roosevelt is said to have remarked that "the man who loves other countries as much as his own stands on a level with the man who loves other women as much as he loves his own wife."[1]

It would take a long time to recount the history of the military installations of San Antonio. However, I would like to speak of military medical education in this area.

The School of Aviation Medicine was moved to Brooks Field on 30 June 1926. With its growth, requirements soon developed for more space and for more diverse professional activities. As a consequence, the School was moved into new quarters at Randolph Field on 30 October 1931. A new headquarters building for the School of Aviation Medicine was dedicated in April of 1943. Earlier this year, on 10 May, I had the honor of participating in ground-breaking ceremonies for another new School of Aviation Medicine which is now being constructed at Brooks.

I wish to call your attention also to the Army Medical Field Service School at Fort Sam Houston and to Brooke Army Hospital which has been an outstanding treatment and teaching center for years. I wish to express official thanks to the Army for the many opportunities afforded members of the Air Force Medical Service attending special courses at that school and Brooke Hospital which enable them to better serve their country in medical activities. There are bonds of understanding in the fields of medicine that allow productive interservice cooperation. The installations I have mentioned, together with the many other regional military hospitals and special clinical and laboratory activities, have stamped this geographical area as a significant center of military medicine.

NEED FOR MEDICAL EDUCATION

I have spoken of the military, cultural, and medical teaching activities of this area as a means of introducing a theme for further discussion—a theme of medical education. This new hospital that we dedicate today is a great teaching hospital.

In addition to providing first-class medical care for the military community, this hospital will be utilized for years to come as one of the principal teaching institutions for medical officers and health specialists who serve the Air Force.

The growth of the great body of medical knowledge and the requirement for higher levels of medical education and detailed knowledge in so many clinical specialties make it necessary that physicians and others engaged in the health sciences be given frequent and stimulating opportunities to improve their knowledge and their skills. They need the teaching atmosphere of institutions such as this, as well as experience in hospital practice to provide the intellectual stimulation necessary for continual acquisition of new knowledge and understanding, for no physician's education is ever completed. Stagnation here, like stagnant water, breeds the vectors of health failure.

It is our ambition in the Air Force that our community hospitals scattered throughout the world each become in some measure an educational institution in which medical officers will have an opportunity of practicing their profession, and where they will enjoy an interchange of ideas between themselves and civilian specialist consultants of the community in which they are located. Only by such means can we maintain the high standards of medical care deserved by those in uniform, and only through continual education and training can we be assured of being professionally prepared for the exacting demand of national defense.

Perhaps you have heard military men speak of education and training. These two terms are names of related programs. Training is the development or the perfection of skills and technics, while education is the acquisition of new knowledge. We must not consider education and training solely from the standpoint of that which is prescribed for academic recognition but rather as that which fits us for progressive and productive service. It is true that we need the tools of knowledge and procedures, if we would continue to build during the years following medical school. However, what we need more than the sheepskins of graduation and specialist certification is the desire and the ability to contribute effectively throughout a lifetime of progressive service. We continue to increase in stature as physicians or specialists in health fields with the growth of our fund

of knowledge in science and technology only if this knowledge is translated into service and the practice of good medicine. There is a compelling need for the desire to grow during our productive years—the desire to know more and to contribute more just for the personal satisfaction of positive accomplishment as distinct from mere recognition of academic attainment.

And what is the genesis of this need to know more and do better on our part? Fundamentally, it is our awareness that there are men, women, and children who need the best of medical care—and in the military service, it is even more; it is the need of engineers who must create weapons and munitions operable within the limits of human tolerance; it is the need of men who must survive the strange environments of modern combat; it is the need of our country which cannot long endure unless each citizen becomes fully worthy of his hire.

Doctor Detlev W. Bronk, president of the National Academy of Sciences, in a recent article in *Air Force* on the education and use of scientific manpower, said: "If we are going to utilize our scientific manpower better, we must somehow revive the realization in our population that there is a joy and a zest in hard work. Our Nation . . . became great because men had things they wanted to do with devotion. Unless we can recapture that love of hard work, we will utilize our manpower badly."[2]

He was not preaching drudgery or such devotion to duty that enjoyable, wholesome recreations are missed. Hard work should never be allowed to shut out the tempering and sustaining qualities of recreation or a sense of humor. In contemplating the idea of hard work, I ran across an anonymous quotation which may express the experience of many of us: "I have met but few people in my time who were enthusiastic about hard work, and it was just my luck that all of them happened to be men I was working for at the time."

ART VS. SCIENCE OF MEDICINE

In the practice of medicine today, the physician needs more help than he recognized the need of twenty years ago. So many of the obtuse complaints, illnesses, and injuries that the doctor sees in his office today point up his personal and his office limitations in arriving at a satisfactory diagnosis or a course of treatment. He is limited in the evaluation of his therapy unless highly technical laboratory assistance is available to perform essential tests. A working knowledge of the complicated biochemistry of sugar, albumen, globulin, the conjugated proteins, cholesterol, sodium, potassium, calcium, and all of the large family of steroids, hormones, vitamins, and enzymes has become a necessity for today's sophisticated practice of medicine. Not

only does the clinician recognize this need, but an increasingly educated public demands more scientific medical attention than that furnished by the triad of the Empirics. But let me hasten to add that this triad of chance observation, preceptorship, and comparative analogy has supported medicine for more than two thousand years, and probably still accounts for much more medical care available to the civilized world than does the science of ivory towers, and I would be the last to advocate that this art of medicine be discredited.

I do advocate, however, that it is the duty of all men and women in health fields to become more knowledgeable in the science of medicine and health maintenance, because good health, good nutrition, good living conditions, and good minds provide the greatest resources of this country and the greatest hope for world peace.

In contemplating peace, there seems to be a relationship between war and disease. War is a form of politico-economic-social disease which, like the maladies of the flesh, can be avoided by continuous health precautions. Our ambitions and methods of attaining victory over disease are very much like our ambitions to attain victory over war itself. Such victories, however, cannot be attained by wish fulfillment, but only by a constructive alliance between men of good will whose faith and trust in themselves, their country, and their God stimulate them to work and wisdom instead of inactivity, futility, or complacency.

Medical science has attained many victories over diseases. We seldom see smallpox, typhoid, yellow jack, plague, or typhus. We are reducing the incidence of polio and influenza; tuberculosis is gradually coming under control; soon we may be able to say the same thing of cancer, heart disease, arthritis, and many of the others, but it can never be said of these diseases that they have been conquered except by great expenditures of money, time, effort, education, dedication, and tireless work. Like war itself, the diseases we have apparently conquered are lying dormant, ever ready to strike back at a relaxed or careless world that neglects attention to the continuing tasks of control.

There is a need for all physicians whether they be in the military service or in civilian life to be in frequent contact with a teaching atmosphere. Experience is a great teacher, but the science of medicine is too large for one man's experience to keep him at the peak of professional competence. The mutually teaching atmosphere of hospitals such as this must be distributed as best we can to all our hospitals, both large and small. This is easier in the military services because our operational policies provide that physicians move about at various intervals throughout their military life. Our career control management disallows that a man

responsible for clinical care of patients stagnate in some circumscribed area out of contact with the progressive stimulation of continuing medical education.

The needs of medical education that I have discussed here are in the minds of medical educators everywhere. The American Medical Association's Council on Medical Education and Hospitals briefly defines postgraduate medical education as "those educational activities engaged in by persons possessing the degree of Doctor of Medicine which are primarily designed *to keep them abreast of their own particular field in medicine.*"[3] These activities concern basic medical education as well as new developments in the field.

MEDICAL SCHOOL IN SAN ANTONIO

This community of San Antonio is a growing center of clinical and military medical education. The Brooke Army Hospital, the Army Medical Field Service School, the Air Force School of Aviation Medicine, this teaching hospital here at Lackland, and the growing clinical capacity of your medical societies and hospitals, all point in this direction.

During the process of selecting a site for the new School of Aviation Medicine, a heavily weighted factor served to keep San Antonio from a position of unquestioned first choice. We believed, and still believe, that our new School and research laboratories should be in the neighborhood of a first-class medical school, that much could be gained by association between two such teaching and research institutions. There was no medical school here, but San Antonio was finally selected because of many overriding advantages and because we had faith that this city would one day have its own medical school. I hope it will come in the near future. It is a community and national need that should not be denied.

Today I have discussed the future of this hospital in terms of its leavening influence in the fields of continuing medical education and training for the Air Force Medical Service. To that end, and to the primary mission of furnishing a high-level medical and hospital service to the military community, this new Lackland Air Force Hospital is hereby dedicated.

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AVIATION PATHOLOGY

The Role of the Pathologist in Investigating Aircraft Accident Fatalities

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THE primary purpose of this article is to review the sequence of events in the progress of aviation pathology and to indicate the role therein of the Armed Forces Institute of Pathology (AFIP). This newly created discipline was launched in March 1955 by a conference held at the Institute, the objectives of which have been reported by Berry.[1] The conference, which was attended by aviation representatives of the Armed Forces of the United States, Canada, and the United Kingdom, was called to explore ways and means of counteracting the mounting toll of aircraft accident fatalities in the countries represented.

Aviation is confronted with many complex developments affecting both men and machines. As a result, new problems have arisen and old ones have been brought into sharper focus. Among the foremost is that of flight safety. Though much progress has been made in achieving greater safety, with a resulting decline in the over-all accident rate per number of flying hours, yet the total number of fatalities has increased. Thousands of lives are lost each year, including those of hundreds of rated pilots. The human suffering cannot be measured, and economic losses are staggering. Reporters, quoting authorities, have proclaimed that accidents cost the Navy and Air Force some two million dollars a day in material losses alone. The appalling loss of highly trained men and expensive machines stems from our rapid technological advances, with the creation and employment of high-performance aircraft capable of attaining speeds and altitudes once considered fantastic. And the end is not yet in sight, as space itself is being challenged.

By reason of this high total of aircraft accidents, and particularly those of unexplained origin, which number 14 per cent and contribute 40 per cent of the fatal accidents,[2] a concerted effort was initiated to investigate more thoroughly the role of the human element. This step is justified by reports that well over

From Armed Forces Institute of Pathology, Washington, D. C.

50 per cent of accidents are attributed to pilot failure.[3] The primary objective for the investigation of aircraft accidents is to determine the cause and thereby prevent recurrence. Over the years, engineers and material specialists have demonstrated the value of a detailed examination of the fragments of a wrecked aircraft in their search for clues to the disaster. Less attention had been given to a careful study of the human remains aimed at determining if structural failure of the man may have contributed to the cause of the accident.

Eventually it became apparent that one field of medical science had not been fully utilized by the aircraft-accident investigation team. That field is pathology. The contribution that the pathologist could make was dramatically demonstrated in the investigation of the British *Comet* disasters over the Mediterranean in 1954. The investigating pathologists discovered from autopsies performed on bodies recovered that the occupants had suffered a violent upward and forward motion, as revealed by head and chest injuries and skin abrasions. It was deducted that the injuries were due to sudden decompression of the cabin pressure from a structural defect in the overhead toward which the occupants appeared to have been forced. The latent energy in a large pressurized cabin such as the *Comet's*, flying at a cruising height of 30,000 ft., has been calculated as being equivalent to that contained in 100 pounds of high explosive. Later, the reconstruction of wreckage recovered from one of the planes, and the testing of others, proved that the deduction of the pathologists was correct, inasmuch as a 162-sq. ft. defect was discovered, located over a seam above one of the windows.[4] With this and other data as a background, the need for intensive study of the pathology of aircraft accident fatalities was recognized.

JCAP ESTABLISHED

In November 1955, acting on recommendations of medical officials who had attended the March conference at the AFIP, the Department of Defense issued a directive[5] establishing the Joint Committee on Aviation Pathology (JCAP). This committee is now composed of representatives from the U. S. Army, Navy, and Air Force; the Royal Canadian Air Force; and the Royal Navy and Air Force. The Directive designated the Armed Forces Institute of Pathology as the central co-ordinating facility for investigation of the pathology of aircraft accident fatalities. To meet this responsibility, the AFIP organized a Forensic and Aviation Pathology Section by integrating an Aviation Pathology Unit within the already existing section on Forensic Pathology. This was a natural merger, inasmuch as forensic pathology is the subspecialty that has long been engaged in the medical investigation of accidental, violent, and unexplained deaths. An Aviation Toxicology Laboratory also was set up solely for the support of this program.

SCIENTIFIC CONFERENCE HELD

In November 1956 the JCAP sponsored a second conference, again held at the AFIP. There were about 80 military and civilian participants, including representatives from the United Kingdom and Canada. In addition to pathologists and flight surgeons, engineers and other individuals concerned with flight safety also were present. Twenty-four scientific papers were read at this meeting, and a résumé of the proceedings is now available from the AFIP as JCAP Memorandum No. 3. Since then several more papers on this subject have been presented at scientific meetings, and a few articles[6-8] dealing with the functions of pathology as they relate to aviation medicine and flight safety have appeared in the literature. Each of the armed services has issued regulations and instructions concerning the pathologic support of aircraft accident investigations. These are listed in Appendix 1 by number and title, together with a brief summary of each.

THE PATHOLOGIST AND HIS SERVICES

The Armed Forces have progressed rapidly in developing the new field of aviation pathology and in utilizing the knowledge and experience of their existing group of trained pathologists in aircraft accident investigations. In the military services, the significant role of the pathologist in this area of aviation medicine is not only recognized but has become established. To be contributory, however, the work of the pathologist must encompass more than the time-honored, routine procedures of pathology. Some degree of special training and an acute awareness of the many factors involved in the "man-aircraft" relationship is necessary. The combination of pilot, flight surgeon, and trained pathologist in one individual is ideal, and the military services are fortunate indeed to have a small nucleus of such highly qualified specialists who are assigned to aviation pathology.

At the AFIP, the Aviation Pathology Section is currently staffed by four Air Force pathologists, one of whom is a qualified pilot, and in the near future this group will be augmented by a Navy pathologist. The Aviation Toxicology Laboratory is staffed by a trained toxicologist and three technical assistants.

Specialized training in aviation pathology at the AFIP covers not only the processing of pathologic material received from aircraft fatalities and interpretation of the findings but also field trips for active participation in the investigation of selected aircraft accidents. The Commander, Headquarters Command, Bolling Air Force Base, Washington, D. C., has made air transportation available to the AFIP on an on-call basis as required in the implementation of this program. Participation in a few such field investigations has already been accomplished, the latest being that concerned with the Pan American Airline disaster in the

Pacific Ocean in November 1957. At the request of the Civil Aeronautics Board, two AFIP pathologists were flown to the U. S. S. *Philippine Sea* to conduct pathologic examinations on the bodies recovered from the wreckage. While a service of this kind is important, it must be realized that at present it is available only for disasters of unusual interest and upon special request to the AFIP.

It is expected that with augmentation of the program and with more pathologists gaining interest and being trained in this field, there will be qualified aviation pathologists locally available in various geographic areas throughout the country. Until that time, the services of the military pathologist nearest to the scene of the accident will be utilized, or if none is conveniently available, the services of a local civilian pathologist may be authorized. For the time being, however, it is presumed that post-mortem examinations will necessarily be conducted in many cases by flight surgeons or other medical officers.

SHIPMENT OF SPECIMENS

The AFIP having been designated the central co-ordinating facility, direct shipment to the Institute of pathologic material from accidents is authorized. Two types of specimens are to be collected: frozen, fresh tissue for toxicological study, and formalin-fixed tissue for histopathologic examination. Tissues for toxicological evaluation should be frozen rapidly, preferably with carbon dioxide, and packed with sufficient dry ice to keep the specimens frozen during shipment. The toxicological study routinely consists of tests for (1) lactic acid, as an indicator of hypoxia, and for which only brain or spinal cord can be used; (2) carbon monoxide, for which blood or the more bloody organs such as lung, spleen, liver, or muscle should be submitted; and (3) alcohol, the test for which can be performed on any parenchymal organ such as the liver or kidney. The tissues for histopathologic study should be fixed in 10 per cent neutral Formalin (brand of formaldehyde).

Explicit instructions concerning the collection, preservation, and shipping of pathologic specimens to the AFIP are contained in the regulations listed in Appendix 1. Shipment is facilitated by placing specimens in plastic bags before packing. Packages containing the specimen for toxicological examinations may be flown by military aircraft to the Washington area, and upon telephonic or message request from the contributor to the AFIP (Tel: Randolph 3-1388), stating time and place of arrival, a special messenger will be dispatched to meet the airplane. Packages also may be forwarded by Air Express, Special Delivery, addressed to The Director, Armed Forces Institute of Pathology, Washington 25, D. C. They should be labeled, "FRAGILE, RUSH SPECIMEN

FOR TOXICOLOGICAL EXAMINATION: (AIRCRAFT ACCIDENT)."

Upon completion of the necessary studies all available data are correlated, evaluated, and summarized by the AFIP, and copies of the final autopsy protocol are forwarded to the contributing activity and the Safety Center of the service concerned. During 1957, specimens from 635 aircraft accident cases were received at the AFIP: 503 from the Air Force, 90 from the Navy, and 36 from the Army. In addition, 93 case reports for file were received from the Royal Air Force and 6 from the Royal Canadian Air Force, indicating that an effective liaison has been established with representatives from both these foreign countries to the Joint Committee on Aviation Pathology.

FACTORS CONSIDERED IN APPROACH

The field of aviation pathology has been approached through a consideration of three principal factors: (1) environmental (altitude—hypoxia, decompression sickness; speed—G forces, spatial disorientation, windblast; toxins—carbon monoxide, fuels, odors; temperature—excessive heat or cold, humidity; noise—vibratory and auditory; and stress—mental and physical), (2) traumatic, and (3) pre-existing disease.

Environmental Factors

One of the most important problems in the environmental group is the post-mortem detection of acute ante-mortem hypoxia or anoxia. Because histopathologic changes are of little or no value in the diagnosis of these conditions, other tests were sought. Through a joint effort of the Royal Canadian Air Force Institute of Aviation Medicine and the U. S. Air Force School of Aviation Medicine, a test on post-mortem tissues was devised that seemed to indicate the existence of acute ante-mortem hypoxia. This test utilizes frozen, fresh, central-nervous-system tissue to measure lactic acid concentration. It has shown promise both in laboratory animals and as a routine test at the AFIP.

Lactic acid levels in central-nervous-system tissue of over 200 mg per 100 grams were found indicative of hypoxia or hyperventilation, although the elevated value does not differentiate the cause of hypoxia, which may result from various conditions such as a lack of oxygen from altitude, the ingestion of certain drugs, drowning, et cetera. In 181 aircraft accident cases in which this test was performed routinely at the AFIP, there were 7 in which a value of over 200 mg per 100 grams was obtained. In one case there was definite evidence that the elevation was due to hypoxia suffered by the pilot concerned; in three, hyperventilation was in all likelihood the cause; in two, drowning was responsible for the elevated level; and in one the administration of barbitu-

rates to the hospitalized pilot after an aircraft accident resulted in elevation of the lactic acid level.

Much work has been devoted to the environmental problem of toxins, especially carbon monoxide. Although this has been one of the more commonly incriminated toxins associated with aircraft accidents, a review of the records of the Directorate of Flight Safety Research, U. S. Air Force, reveals that cases showing elevated carbon monoxide values usually were associated with viability and a history of fire, either in flight or following ground impact. The most practical value placed on a post-mortem carbon monoxide level, therefore, is in determination of the sequence of events, *i. e.*, was the airman alive or dead at the time fire ensued?

For the past several years, the U. S. Air Force School of Aviation Medicine and Aero Medical Laboratory have worked urgently to perfect technics for the detection of carbon monoxide. In recent months the AFIP has joined in the search for a simple, sensitive, and specific method for carbon monoxide determination on post-mortem tissues, blood being rarely available. The results are reported as per cent carboxyhemoglobin saturation as for blood. Levels less than 10 per cent are considered insignificant, inasmuch as heavy smokers may attain values as high as 10 per cent. The carboxyhemoglobin combination is a strong bond, and carbon monoxide may remain fixed in post-mortem tissues indefinitely, having been detected in exhumed and embalmed bodies, as well as in those in an advanced state of decomposition.[9]

Currently the AFIP is routinely analyzing tissues submitted for carbon monoxide and already has done so in 296 cases. The method now employed utilizes bloody extracts from tissues, and the analysis is performed as for blood. This method has demonstrated an elevation in 14 of 137 cases, all of which have been in conjunction with fire, usually following impact. This finding of significant amounts of carbon monoxide is indicative of survival following the onset of the fire, and such information is at times of inestimable value to aircraft accident investigators.

Traumatic Factors

The second broad group of pathologic changes studied in aircraft accident fatalities centers about the traumatic aspects. In many instances these overshadow other considerations to such an extent that one is sometimes asked, "Why perform an autopsy when the cause of death is so obvious?" In aircraft accident fatalities, however, it is not enough simply to state the immediate cause of death, such as crushed chest or broken neck or multiple, extreme injuries. It is necessary to pinpoint the cause of the injury that resulted in the lesions producing death. For instance, if the cause of the accident is established, such as a mechanical

failure of the plane, the prosector should devote the majority of his efforts to determining how the crew member sustained his injuries, by relating them to known mechanisms of the accident. From this the architects and engineers may learn what can be done to prevent such injuries. This is chiefly a process of deductive reasoning on the part of the prosector, where much study can be devoted to a narrow field.

On the other hand, if the cause of the accident is unknown, the prosector should gain as much information as possible about the circumstances of the accident before he starts the autopsy. Without it, much time and effort may be wasted in irrelevant work. The autopsy should be a careful and detailed study, employing an inductive reasoning approach and utilizing as many adjunctive studies as possible. In such cases, items not to be overlooked should include: removal of the inner ears for histopathologic detection of conditions possibly causing vertigo; section of the coronary arteries at 2-mm intervals for demonstration of a possible coronary thrombosis; examination for evidence of a cerebral aneurysm, even in the presence of a cerebral hemorrhage (in order to determine whether the hemorrhage was spontaneous or traumatic); examination of the cervical vertebrae for possible fracture; and chemical studies of tissues for the presence of toxic substances. An essential part of all gross autopsies performed on aircraft accident fatalities is a detailed examination of the condition of the clothing and protective equipment.

The correct interpretation of certain pathologic findings frequently will lead to invaluable clues in unraveling the sequence of traumatic events. When examining the heart and lungs for lacerations, it is important to note if the lacerations were made by fractured ribs, and if so, by which ones. If there is a laceration of the aorta, was it caused by a fractured bone or was it the result of a sudden deceleration, each of which show characteristic lesions? Sudden deceleration shows lacerations located in the arch of the aorta, just distal to the left subclavian artery (fig. 1). In a laceration of the liver it would be helpful to know if it was a result of rib fractures or of a crushing injury impinging the liver against the vertebral column. The anatomic demonstration of soot, either grossly or microscopically, within the respiratory tract, especially the lungs, indicates that the crew member inhaled smoke and was alive in the presence of a fire (fig. 2). It is well to remember that heat alone may produce false epidural hemorrhage or artifactitious fractures, particularly of the skull (fig. 3).

Several interesting features have been observed during the microscopic study of severe traumatic lesions, one being pulmonary embolism. In practically every traumatic death, whether from aircraft or automobile accident or other cause, there is some type

of pulmonary embolism. Intravascular fat can be found within the alveolar walls in well over 90 per cent of the aircraft accident cases, minimal in about a third of the cases, but in marked degree

Figure 1. Sketch of the aortic arch demonstrating the most probable sites of rupture caused by abrupt deceleration.

in 25 per cent. Comparable findings have been reported in battle casualties.[10] Other pulmonary emboli following injury are those consisting of bone marrow in approximately 20 per cent of cases. Liver (fig. 4), brain (fig. 5), and air emboli also may be seen occasionally in the pulmonary vessels. The observation of these emboli tends to vary directly with the avidity with which one searches for them.

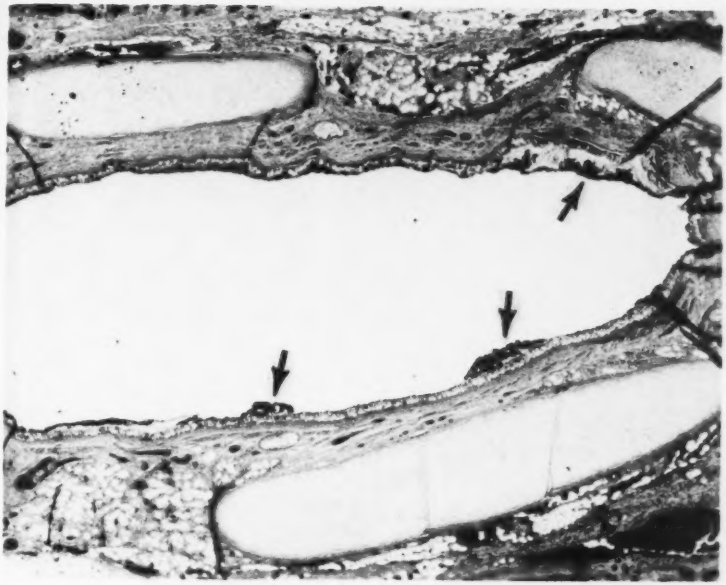

Figure 2. Photomicrograph showing soot particles on the tracheal mucosa. These are indicative of inhalation of smoke. (Hematoxylin and eosin stain, × 13)

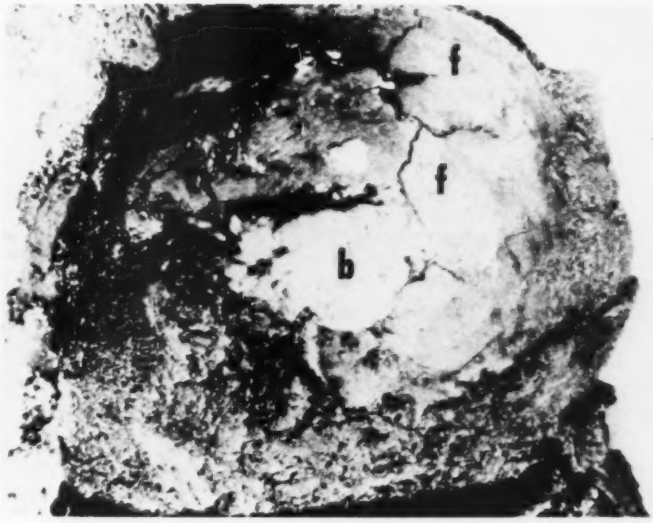

Figure 3. Photograph of skull following burns, showing the stellate fractures (f) and extrusion of cerebral tissue (b) caused by heat.

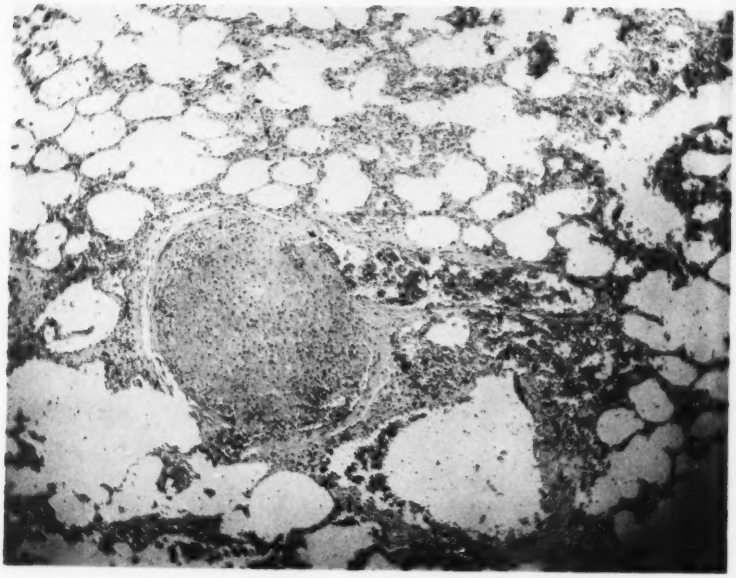

Figure 4. Photomicrograph of lung showing embolus from liver situated at the bifurcation of a pulmonary vessel. (Hematoxylin and eosin stain, × 65)

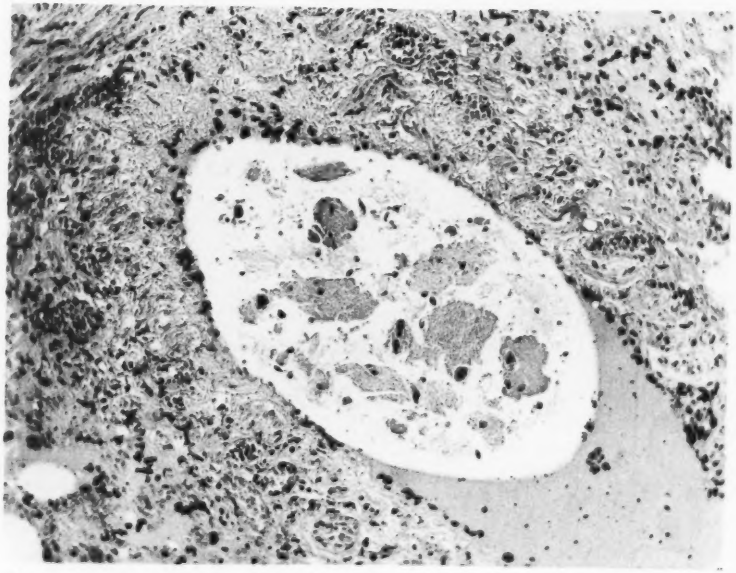

Figure 5. Photomicrograph demonstrating numerous small cerebral tissue emboli in a pulmonary vessel. (Hematoxylin and eosin stain, × 160)

Pre-existing Disease

In the realm of pre-existing disease, the presence of coronary sclerosis offers much room for speculation. A coronary attack in the pilot of a single-place aircraft could well result in another unexplained aircraft accident. Although many of the coronary arteries examined in deceased pilots show moderate to marked coronary sclerosis, the following three cases illustrate the problem the pathologist faces in evaluating coronary arteries from autopsy material, and the necessity for a cautious interpretation of the significance of the findings.

Case 1. A 40-year-old pilot was conducting strafing and bombing missions upon surface ships. During one of these attacks, his aircraft was seen to "nose-up," then return to its horizontal flight path, and finally dive into the side of the ship. Examination of the wreckage showed no evidence of mechanical failure. The autopsy revealed advanced coronary arteriosclerosis, with an acute thrombosis, causing sudden incapacitation of the pilot, resulting in the accident.

Case 2. A 37-year-old pilot had made normal radio contacts and was flying as scheduled. When he failed to make his next routine radio check, an immediate search was instituted. The fatally injured pilot and wreckage were found three days later. Although numerous injuries were present, the heart showed severe coronary arteriosclerosis and, in addition, there was myocardial fibrosis that indicated previous episodes of coronary insufficiency. In this case the question can be raised, "Was the accident the result of a coronary attack?"

Case 3. A 27-year-old pilot of an F-102 aircraft was killed in an engine-failure accident. Radio communications immediately prior to the accident revealed he was physically and mentally alert. There had been no previous history of cardiac symptomatology, though the autopsy showed severe coronary arteriosclerosis. In this case there was no evidence to indicate that coronary disease had played any role in the accident; however, if the fact of engine failure had not been known, pilot failure through coronary insufficiency might well have been incriminated as the cause.

It is well known that coronary artery arteriosclerosis is not confined to the elderly or middle aged. This was clearly demonstrated by AFIP pathologists in a wound ballistics study in the Korean Conflict, when they examined the coronary vessels of 300 young American soldiers with average age of 22.1 years who were killed in action. Their report[11] indicated that 77.3 per cent of these casualties, showed some gross evidence of coronary arteriosclerosis, in all degrees from "fibrous" thickening to large artheromatous plaques causing complete occlusion of one or more major vessels.

Some of the examples in the AFIP files of pre-existing disease which produced sudden disabling episodes or death in pilots,

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include brain tumors, sickle cell anemia, laryngocele, and abdominal adhesions.

From a study of 62 cases of colloid cysts of the brain on file at the AFIP, three cysts were found to have killed or incapacitated aviators.[12] In these cases any marked exertion, which would be expected to increase cerebral blood flow and therefore the brain volume, would in all probability result in a narrowing of the third ventricle around the cyst, thus favoring a blockage of fluid flow with resulting symptoms of headache, vomiting, et cetera. These symptoms may begin and cease abruptly. Gravity forces in flight, causing increased intracranial blood volume, would presumably be effective in initiating this condition.

In persons with sickle-cell anemia or the sickle cell trait, splenic infarction or sickle cell crisis initiated by hypoxia may occur during air travel.[13]

It thus is seen that even though aviators are given rigid physical examinations periodically and are under the almost constant surveillance of qualified flight surgeons, "pre-existing disease" still may remain undetected and create an ever-present hazard in flight operations. The demonstration of telltale pathologic lesions by the pathologist has accounted for a number of otherwise unexplainable accidents. If the day comes when the clinician is equipped to diagnose some of these disease conditions now demonstrable only by the pathologist, some of the hazards now inherent in man's control of the air will be overcome.

RESEARCH IN AVIATION PATHOLOGY

In addition to the part played by the AFIP in the more or less routine work noted above, research in aviation pathology is being actively carried on. While some of this research is in support of Navy and Air Force investigative projects at various research centers, much of it is primary investigation performed within the Institute itself.

One such support study involved the gross and microscopic pathologic evaluation of rats explosively decompressed to 65,000 feet. This research project was performed at the Air Crew Equipment Laboratory, Naval Air Materiel Center, U. S. Naval Base, Philadelphia, Pa., and was supported from the standpoint of pathology by the AFIP. In an altitude chamber, rats were explosively decompressed from sea-level pressure to a simulated altitude of 65,000 feet, and total fixation in Formalin was performed in that environment. The detailed pathologic findings in these animals is the subject of a report by Gell, Hall, and Mostofi.[14]

Despite over 100 abstracts of varying merit in the literature, this was the first time that a study of the effects of pure explosive decompression had ever been accomplished. Pathologic

studies in the past had not been performed until recompression had intervened. Recompression could have erased the major pathologic findings demonstrated in this project, such as extensive emphysema of the thoracic wall, air bubbles in major blood vessels, and displacement of the upper abdominal viscera into the lower thorax.

Another co-operative study in which the AFIP rendered support was a joint Navy-Air Force project on the effects of prolonged G forces, performed at the Naval Aero-Medical Acceleration Laboratory Johnsville, Pa. In these experiments, chimpanzees were subjected to centrifugal G forces exerted by the Johnsville human centrifuge.

Subjected to a centrifugal force of 40 G for 60 seconds while placed in various positions, none of the animals showed an irreversible pathologic abnormality, although in all cases the traumatic force resulted in varying degrees of hemorrhage. Some animals were unconscious when removed from the centrifuge (having been in a fully reactive state prior to the test), but within 24 hours they appeared normal clinically. When sacrificed 24 to 48 hours later, the autopsy findings consisted only of varying degrees of hemorrhage, mostly within the pulmonary parenchyma and limited mainly to those areas located most peripherally to the lines of the test force. In those animals facing away from the center of the centrifuge, large areas of hemorrhage were found, particularly within the distal portions of the extremities and the periorbital tissues, as a direct result of the pooling of blood caused by the centrifugal forces.

Other research projects dealing with aviation problems in which the AFIP has given support have centered chiefly around the problems of cosmic radiation and the effects of rapid acceleration and abrupt deceleration. One of the more revealing projects of the acceleration series was that of sudden exposure to supersonic wind blast, such as would be experienced by ejection from high-performance aircraft. The Air Force, employing the "snort" track at the U. S. Naval Ordnance Test Station, China Lake, Calif., subjected two chimpanzees to rapid acceleration with a relatively slow deceleration component. The accelerations were in the neighborhood of about MACH 1.8, and within a period of 12 seconds the animals attained that speed from a dead stop. In both instances, the flight suit was ripped from the animal. The anteriorly exposed skin surfaces of the body were compressed and desiccated, producing a tanned, leathery appearance (fig. 6). There was elevation and denudation of the superficial epidermis from the effects of the wind blast and generated heat.

Cosmic ray studies have been carried on in association with the Aero Medical Field Laboratory, Holloman Air Force Base, N. Mex. Balloons, carrying mice in sealed capsules, have been

sent to cruise the stratosphere in order to determine the biological effects of cosmic rays upon living mammals.[15]

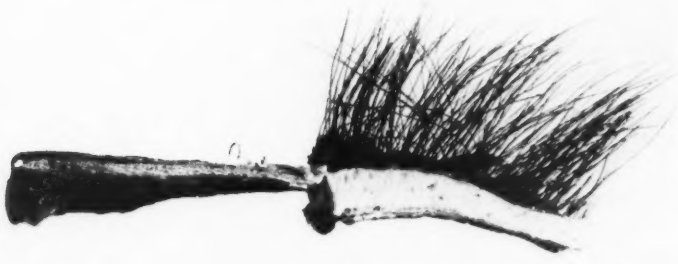

Figure 6. Photograph of desiccated compressed skin from anterior exposed surface of the chimpanzee (left), contrasted with nonaltered skin from posterior nonexposed surface (right). Note the epilation, the desiccated and hardened epidermis, and the compressed dermis.

Research conducted primarily at the AFIP has been chiefly within the environmental problem area. Studies are now underway to correlate the lactic acid concentrations associated with hypoxia with possible structural changes within the cell. Improved methods for the post-mortem detection of acute hypoxia are being sought, and currently the AFIP laboratory is evaluating the significance of a rise in urinary pH in hypoxic states. If this latter proves useful it would certainly be a more easily performed test for hypoxia.

The Aviation Toxicology Laboratory is devoting considerable effort to methodology for the determination of small therapeutic amounts of drugs present in tissues of aircraft accident fatalities. Customarily, the toxicologist deals with lethal amounts of drugs, usually in relatively large quantities, but the current problem facing aviation pathologists is the detection of minute amounts of drugs, for the most part taken without medical advice. Iontophoresis has proved a satisfactory method for initial detection of such drugs as the tranquilizers, antihistamines, barbiturates, alkaloids, and those taken for the prevention of motion sickness.

The JCAP with the support of the AFIP is endeavoring to bring about the indoctrination of (1) flight safety personnel in the need for careful observation and reporting of near accidents; (2) aircraft accident investigating teams in the need for pathologic support; (3) commanding officers in facilitating performance of autopsies; (4) pathologists in careful post-mortem examination and correlation of the findings with the aircraft and safety equipment; and (5) medical examiners, coroners, and pathologists throughout the United States, Canada, and the United Kingdom on the need for detailed pathologic investigation of aircrew fatalities.

CONCLUSIONS

While much benefit has accrued from the current method of pathologic study, there is no substitute for adequate and accurate "on-the-spot" post-mortem examination. Pathologists trained for such investigations of selected aircraft accidents would be ideal. A beginning has been made, and eventually this may be possible on a wider scale. By such means, it is believed that both military and civilian flight safety programs could benefit immeasurably. The staggering economic losses might well be lessened and the toll in human lives be drastically reduced.

SUMMARY

High-performance aircraft have accounted for an increase in the number of accidents caused by so-called pilot error, and accidents of undertermined cause have increased to 14 per cent (40 per cent of the fatal accidents). In order to evaluate properly the pilot-plane combination, it is necessary that in all aircraft accidents an intensive medical investigation be instituted. In an attempt to fulfill the requirement for a complete medical investigation, the Joint Committee on Aviation Pathology (JCAP), with representatives from the United Kingdom, Canada, and the United States, was established. The Armed Forces Institute of Pathology (AFIP) was designated as the central co-ordinating laboratory for JCAP, and organized a new section on Aviation Pathology, staffed by four pathologists and other supporting personnel.

The AFIP has authorized direct shipment of tissues to the Institute for examination. Instructions for the collection and shipment of specimens have been promulgated. The importance of on-the-spot investigation by the pathologist is recognized, and in selected aircraft accidents support will be provided by the AFIP. An aircraft accident fatality is studied from three main viewpoints: (1) environmental conditions, (2) traumatic factors, and (3) pre-existing disease. It is important that a complete examination, including all these facets be made. Research activities sponsored or supported by the AFIP have included studies on explosive decompression, effects of centrifugal G forces, effects of rapid acceleration and abrupt deceleration, morphologic changes in acute hypoxia, and methods for detection of therapeutic amounts of drugs in post-mortem tissues.

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APPENDIX

Joint Air Force, Army, Navy

Medical Service, Joint Committee on Aviation Pathology. AFR 160-127, AR 15-97, BUMED INST 6510.6. 3 September 1957. This regulation prescribes the organization, functions, and membership of the Joint Committee on Aviation Pathology.

Air Force

Medical Service, Medical Investigation of Aircraft Accident Fatalities. AFR 160-109. 12 October 1956. This regulation requires that a medical officer conduct or instigate a thorough medical inquiry concerning the cause and nature of fatal injuries sustained in aircraft accidents. The investigation will include the performance of autopsies.

Aircraft Accident Autopsy Report. AF Form 500, 15 October 1956. This form is used in conjunction with AFR 160-109 and serves as a guide for autopsies on aircraft accident fatalities.

Medical Service—Performing Postmortem Examination. AFR 160-35, Section G, Paragraph 37, 22 June 1956. This regulation states that an autopsy should be performed when death occurs while the person was serving as an aircrew member in a military aircraft.

Flying Safety—Aircraft Accidents. AFR 62-14, 25 January 1956. This regulation defines terminology, establishes responsibility, and pre-

scribes procedures for investigating and reporting Air Force aircraft accidents and incidents.

Aircraft Accident—Prevention-Investigation-Reporting. AFM 62-5, 1 February 1956. This regulation outlines in detail the procedures to be followed in accident investigation and reporting, including the medical aspects.

Navy

Manual of the Medical Department, U. S. Navy, Article 17-24, Post Mortem Examinations and Autopsies. This instruction states that the medical officer should make every effort to obtain autopsies on aircrew fatalities.

Navy Aircraft Accident, Incident and Forced Landing Reporting Procedure. OPNAV INST 3750.6B. 20 May 1956. This instruction sets forth procedures, establishes control, promulgates disposition, and establishes responsibilities in regard to Navy aircraft accidents, incidents, and forced landings. In addition, it requires that medical officers make every effort to obtain autopsies on aircrew fatalities.

Aviation Pathology Program. BUMED INST 6510.6. 3 September 1957. This instruction summarizes the Navy's role in support of the triservice aviation pathology program.

Army

Accident Reporting. SR 385-10-40, Change 7, 24 June 1957. This regulation outlines Army procedure for aircraft accident investigation.

U. S. Army Aircraft Accident Investigation. TB AVN-8. 31 August 1956. This regulation outlines in detail accident investigation and reporting, including the medical aspects.

MALPRACTICE AND THE SERVICE DOCTOR

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MALPRACTICE and professional liability are matters of direct concern to every member of the medical profession, whether he is engaged in private practice or is a doctor serving in the Armed Forces. At common law there was no duty on the part of the doctor to render medical care to an ill person, and the law in this country imposes no liability on the doctor for refusing to take a case, but once medical care is undertaken by the doctor, he becomes responsible for his acts. This is true even if the patient is a charity case.

Recognizing that he should practice his profession with the welfare of the patient uppermost in mind, the doctor asks how he can do this and still protect himself against malpractice claims. Are these two concepts incompatible? How is the service doctor affected by malpractice claims as compared to the private practitioner? Should a medical officer carry malpractice insurance? Are there definite steps that can be taken or procedures which may be followed by either a private or service doctor that will furnish substantial protection to him and either reduce the likelihood of malpractice claims or avoid them altogether?

The realization that these and related questions are constantly in the minds of doctors has prompted the writing of this article in an effort to help the individual doctor, and particularly the medical officer, to arrive at sound conclusions with respect to this complicated medico-legal field. Some of the principles discussed are applicable not only to the medical officer but also, under certain circumstances, to the service dentist, nurse, or other member of the medical team, after making allowance for the different standards of education, training, experience, and knowledge applicable to the different professions.

DEFINITIONS

What is malpractice? It has been defined as: "Any professional misconduct, unreasonable lack of skill or fidelity in professional or fiduciary duties, evil practice, or illegal or immoral conduct."[1] More specifically, as applied to physicians and surgeons, it means bad, wrong, or injudicious treatment of a patient, profes-

From Legal Office, Office of The Surgeon General, Department of the Army, Washington, D. C.

sionally and in respect to the particular disease or injury, resulting in injury, unnecessary suffering, or death to the patient, and proceeding from ignorance, carelessness, want of proper professional skill, disregard of established rules or principles, neglect, or a malicious or criminal intent.[2]

The term *malpractice* appears to be used more and more by the courts as though synonymous with *negligence* on the part of the physician, surgeon, dentist, or nurse. Negligence is: "The omission to do something which a reasonable man, guided by those ordinary considerations which ordinarily regulate human affairs, would do, or the doing of something which a reasonable and prudent man would not do."[3]

In general a legal action based on negligence (malpractice) is founded on a tort as distinguished from an action on a contract as a result of an agreement between the parties concerned. However, the action may be based on a contract in an instance where the doctor agreed to cure or to make a specified improvement in the patient's condition and failed to do so as a result of his medical treatment.

A tort is defined as: "A wrong independent of contract. A violation of a duty imposed by general law or otherwise upon all persons occupying the relation to each other which is involved in a given transaction."[4] Three elements of every tort action are: existence of a legal duty from defendant to plaintiff, breach of duty, and damage as approximate result.[5]

RES IPSA LOQUITUR

With respect to negligence cases there is a doctrine in the law known as "res ipsa loquitur" or "the thing speaks for itself." In malpractice proceedings, plaintiffs and their attorneys often encounter difficulty in obtaining the services of experts in the medical and nursing professions to testify that a colleague was negligent. The doctrine of *res ipsa loquitur* is of great assistance to the plaintiff under such circumstances. Except for this doctrine how could plaintiffs otherwise prove that paralysis, burns, foreign substances in the abdomen, and other such conditions were the result of negligent acts?

Three conditions are necessary for the rule of *res ipsa loquitur* to apply: (1) The accident is of a kind that does not occur in the absence of *someone's negligence;* (2) the injury is caused by an instrumentality within the *exclusive control of the defendant;* and (3) the accident is of a kind that the *plaintiff could not have contributed to by his conduct.* How this doctrine is applied depends on the law of the particular state. In some states proof of the three required conditions is considered as circumstantial evidence, and negligence may be inferred. In other states proof of these three conditions creates a presumption of negligence and

places the burden on the defendant to overcome the presumption. A *presumption* is a deduction which the law requires the trier of facts to make, an *inference* being a deduction which the trier may or may not make according to his own conclusions; a *presumption* is mandatory, an *inference* permissible.[6]

A leading case in the United States on the doctrine of *res ipsa loquitur* as applied to malpractice suits is that of *Ybarra* v. *Spangard*.[7] The essential facts in this case are:

Plaintiff entered a private hospital for an appendectomy to be performed by the defendant. On the day of the operation, he was wheeled into the operating room by a nurse who was an employee of Dr. Swift, who owned the hospital. The anesthetist, also an employee of Dr. Swift, adjusted plaintiff for operation, pulling his body to the head of the operating table and laying him back against two hard objects at the top of his shoulders, about an inch below his neck. The anesthetic was administered and plaintiff lost consciousness. He awoke next morning in his room attended by two nurses, also employees of Dr. Swift.

Plaintiff testified that prior to the operation he never had had any pain in, or injury to, his right arm and shoulder, but that when he awakened he felt a sharp pain between the neck and the point of the right shoulder. He received diathermy treatments, but the condition spread to the lower part of his arm. He could not lift or rotate his arm, and developed paralysis and atrophy of the muscles round his shoulder.

Plaintiff instituted proceedings against the physician who diagnosed the case, the owner of the hospital, the surgeon, the anesthetist, and the three nurses. After his testimony, attorneys for the defendants asked that the suit be dismissed on the ground that the plaintiff did not prove any defendant to be negligent; and, indeed, by all legal standards, he did not. But the plaintiff contended that his testimony showed the existence of the three conditions necessary to invoke the doctrine of *res ipsa loquitur*, that the inference of negligence was established, and that the plaintiff should prevail.

The defendants claimed the doctrine did not apply in this case; that the condition that the instrumentality was in the exclusive control of defendant did not exist, and that the doctrine cannot apply where several defendants are involved and there is a division of responsibility. The court decided for the plaintiff and said:

"But we do not believe that either the number or relationship of the defendants alone determines whether the doctrine of *res ipsa loquitur* applies. Every defendant in whose custody the plaintiff was placed for any period was bound to exercise ordinary care to see that no unnecessary harm came to him and each would be liable for failure in this regard. Any defendant who negligently injured him, and any defendant charged with his care who so neglected him as to allow injury to occur, would be liable. The defendant employers would be liable for the neglect of their employees; and the doctor in charge of the operation

would be liable for the negligence of those who became his temporary servants for the purpose of assisting in the operation.

"We do not at this time undertake to state the extent to which the reasoning of this case may be applied to other situations in which the doctrine of *res ipsa loquitur* is invoked. We merely hold that where a plaintiff receives unusual injuries while unconscious and in the course of medical treatment, all those defendants who had any control over his body or the instrumentalities which might have caused the injuries may properly be called upon to meet the inference of negligence by giving an explanation of their conduct."

This case shows the importance of keeping careful, complete, and accurate case histories and records on each patient. This is important not only for the civilian doctor or nurse but for the service doctor or nurse as well. The doctrine of *res ipsa loquitur* is at issue in a large proportion of malpractice cases in litigation and is frequently held applicable to individual cases by the courts.

RESPONDEAT SUPERIOR

The rule of law known as "respondeat superior" or "let the master answer" has applicability in malpractice cases in certain instances. This rule provides that an employer or principal is liable for the torts committed by an employee or agent in the course of employment or action as an agent. The rule does not absolve the employee from liability; rather, it permits the injured party to sue both the employee and the employer. Frequently the employer is in a better financial position and consequently the suit is brought against the employer or jointly against the employee and employer so that the injured party has a better chance of recovering damages for his injuries.

FEDERAL TORT CLAIMS ACT

It is a general rule of law that a government may not be sued without its consent. This is based on the theory of sovereign immunity and can be traced back to the common law in early English history. It was said, "The King can do no wrong," and consequently no one was permitted to sue the Crown.

However, the Federal Tort Claims Act[4] (FTCA) was passed by Congress and became effective in the United States in 1946. Prior to this, the United States could not be sued for negligent acts of its employees or agents. This Act created consent of liability on the part of the Federal Government where claims are established for damage to or loss of property, or for personal injury or death, caused by negligent or wrongful act or omission of any employee of the Government while acting within the scope of employment or office, in circumstances in which the United States, if a private person, would be liable to a claimant in accordance

with the law of the place in which the act or the omission occurred.

The FTCA provides specifically that the acceptance by a claimant of an award or a settlement shall constitute a complete release by the claimant of any claim against the United States *and* against the employee of the Government whose act or omission gave rise to the claim. The FTCA *excludes* any claim for negligence arising out of the exercise of a discretionary function relating to policy or interpretation, miscarriage of mails, assessment or collection of custom duty, quarantine, assault and battery, false imprisonment, false arrest, malicious prosecution, abuse of process, libel, slander, misrepresentation, deceit, interference with contract rights, the operations of the Treasury, or combat activities of military forces during time of war. It also excludes any claim for negligence arising in a foreign country, or in the operation of the Tennessee Valley Authority or the Panama Canal.

In effect, the FTCA establishes consent on the part of the Federal Government to liability under the rule of *respondeat superior* for negligence of employees committed in the course of employment. There is no consent to being sued for claims arising under the exemptions stated. A person having a claim for any cause other than negligence, as limited, would be in the same position as were claimants sustaining negligent injuries prior to the enactment of the FTCA, and as are claimants who have sustained injuries committed by state governmental employees. Such claimants cannot institute legal proceedings in courts; they are required to seek the aid of Congress in case of a claim against the Federal Government, or the aid of the appropriate state legislature in the case of a claim against a state government, for the enactment of a special law to compensate them for damages sustained.

The United States District Courts have exclusive jurisdiction over suits brought under the FTCA; however, claims under $1,000 may be compromised and settled by the heads of federal agencies and departments. The Army has published regulations setting forth the procedure for settling these claims.[9] Claims over $1,000 may be compromised and settled, but must be approved by a Federal Court. Claims not settled may be determined by proceedings in court, which must be commenced within a specified period of time, depending on the statute of limitations in effect where the cause of action arose, and generally within one year from the date of the commission or omission constituting negligence.

Also, certain claimants may file an administrative claim, but not a suit, under the provisions of the Military Claims Act of 1943.[10] This statute has been implemented by regulations of the Army.[11] Thus a claimant may have a remedy under one of the two

above named Acts. He may also bring an action against the individual doctor, but he is more likely to bring the action against both the doctor and the United States.

If an Army or other Government agency doctor is sued individually, he may request that the case be removed to a Federal District Court if the action is brought in a state court.[12] In any case where an Army doctor is sued individually or sued jointly with the United States, a report of litigation, in accordance with published regulations, should be submitted to the Department of the Army.[13] Arrangements may then be made by the Office of The Judge Advocate General with the Department of Justice for the local United States Attorney to make an appearance in the case and defend the doctor and the United States.

If a judgment should be obtained against an Army doctor individually, the Department of the Army would, in all probability, sponsor a private bill in Congress to give him relief. *In the past it has not been necessary to seek such legislation, as no case has been reported where an Army doctor has been held by a decision of a court to be individually liable,* although bills are now pending before Congress to give relief to two Army employees held individually liable in traffic cases. If a judgment is obtained against the United States, subsequent recovery from the individual doctor is barred by the statute.[14]

A major difficulty in applying the rule of *respondeat superior* is in determining whether the employee was acting within the scope of his employment; however, "scope of employment" has been defined to mean "acting in the line of duty" when applied to a member of the military forces.[15] The Federal Government therefore is liable for the acts of its employees in the same manner as a private employer is liable.

A case as to whether the employee was acting within the scope of his employment was decided in *Watt* v. *U. S.*,[16] wherein it was held that the Government was not responsible for the negligent operation of a government truck by a sergeant of the National Guard, because the man's job description did not provide for his driving military vehicles and consequently he was acting outside the scope of his employment. In another case, *Dishman,* v. *U. S.*,[17] an employee of the Veterans Administration, had carbolic acid poured into his ear for an ear pimple by a physician of the Veterans Administration. The Court held the Government was liable, as the regulation of the Veterans Administration authorized treatment of minor ailments of employees and the physician was therefore acting within the scope of his employment.

The United States would not be liable, even if the physician was acting within the scope of his employment, if the cause of action falls within one of the specific exemptions to the Federal

Tort Claims Act. One of the exceptions, for example, is an action based on assault and battery. This tort is the basis for many professional liability suits such as those involving unauthorized operations and treatments. In the case of *Moos* v. *U. S.*,[18] which arose in Minnesota, the plaintiff's right leg and hip were operated on in a Veteran's Hospital, when it was his left leg and hip that needed the operation. His suit was dismissed as being an action for assault and battery and not actionable under the FTCA. It should be kept in mind, however, that the plaintiff could still sue the individual doctor in a case such as this.

Another type of case excluded under the FTCA is any claim for negligence arising out of the exercise of a discretionary function relating to policy or interpretation. Problems in this area have arisen in the past with respect to furnishing medical care to dependents of military personnel. The question of what is or is not a discretionary function has caused the courts considerable difficulty. It was held in *Denny* v. *U. S.*[19] that since admitting dependents of military personnel to government hospitals is discretionary, no action could be brought for negligence under the FTCA. However, it was held in *Grigalauskas* v. *U. S.*,[20] a Massachusetts case, that once the discretion is exercised and the patient admitted, the discretionary function ceases and the Government is liable for any subsequent negligent acts. It also was held in *Costley* v. *U. S.*[21] that the use of an anesthetic containing a harmful substance was not a discretionary act and did not fall within the discretionary exception under the FTCA. After the Texas City disaster, it was held in *Dalehite* v. *U. S.*[22] that action against the United States under the FTCA could not be maintained, because of the principle of discretionary function. Recent decisions of the Supreme Court in the case of *Indian Towing Co.* v. *U. S.*[23] and in the *Eastern Airlines case*[24] indicate that the discretionary act exclusion is now limited to those decisions made on a policy-making or planning level, and decisions made on an operational level could not be used as a basis for denying a cause of action under FTCA, even though some discretion is involved.

The question of whether a serviceman has a right to sue under the FTCA was settled in *Feres* v. *U. S.*[25] The opinion covered three cases. One, *Jefferson* v. *U. S.*,[26] was a suit by a veteran who had a towel left in his abdomen during an operation in an Army hospital while he was still on active duty. Another case was *Griggs* v. *U. S.*,[27] which concerned an officer in the Army who died after treatment in an Army hospital, while the Feres case involved an officer of the Army who died in a fire in the barracks. The Court held that none of these claims could be maintained under the FTCA, because the injured parties were servicemen on duty at the time of injury or death. The opinion

points out that the Government has financially provided for members of the Armed Forces in different ways and that traditionally members of the armed services could not sue the Government for injuries received while on duty. It would bring chaos to the order and discipline of the Armed Forces to allow every serviceman to sue the Government for every real or fancied wrong he might suffer.

The limitations discussed with respect to discretionary functions would apply also to civilian employees of the Government. Prior to 1949 it appears that a civilian employee could elect to proceed under the FTCA or the Federal Employees' Compensation Act.[28] In 1949 Congress amended the latter Act so as to make it the exclusive means of compensation for a civilian employee killed or injured "while in the performance of his duty."[29] It will be noted, however, that in the case of *Dishman* v. *U. S.*[30] the Court held that an employee of the Veterans Administration could bring an action under FTCA for negligence of a physician of the Veterans Administration in treating a pimple in the ear, as the injury was not incurred in the performance of duty and therefore was not governed by the Federal Employees' Compensation Act. Very few cases are found which involve claims under the FTCA by civilian employees against government physicians. This indicates either that such claims are being handled under the Federal Employees' Compensation Act or that comparatively few civilian employees are being treated by government physicians.

The question may be raised as to whether the enactment by Congress of the Dependents' Medical Care Act[31] is likely to result in more malpractice claims against service doctors. Section 103 (a) of the Act provides:

> Whenever requested, medical care shall be given dependents of members of a uniformed service, and dependents of persons who died while a member of a uniformed service, in medical facilities of the uniformed services subject to the availability of space, facilities, and the capabilities of the medical staff. Any determination made by the medical officer or contract surgeon in charge, or his designee, as to availability of space, facilities, and the capabilities of the medical staff, shall be conclusive. The medical care of such dependents provided for in medical facilities of the uniformed services shall in no way interfere with the primary mission of those facilities.

This statute has codified a substantial part of what was in the law and pertinent regulations prior to its enactment. In addition to setting out the types of medical care that may be furnished, it specifically prohibits or limits others which formerly were prohibited or limited by policy and regulation, such as ambulance service, domiciliary care, and treatment of nervous and mental

disorders. The new law specifically provides that "any determination made by the medical officer... as to the availability of space, facilities, and the capabilities of the medical staff shall be conclusive." Consequently, there does not appear to be any mandatory requirement to admit and treat dependents of military personnel in military medical facilities, and no increase in malpractice claims or suits against service doctors of the United States should be expected as a result of the enactment of the Dependents' Medical Care Act.

OVERSEAS AREAS

The FTCA has no application with respect to claims arising in a foreign country and could not be the basis for a claim against a service doctor or the United States as a result of medical treatment the doctor rendered abroad. Also, the United States has not waived its sovereign immunity that prevents it from being sued in foreign courts. The Foreign Claims Act of 1942[32] permits claims against the United States by an inhabitant of the country in which the claim arose, and this Act has been implemented by Army Regulations,[33] but procedures for handling claims by inhabitants of foreign countries would, for the most part, be inapplicable to the problems under discussion, as we are primarily considering claims on the part of military personnel, civilian employees, or their dependents.

Treaty arrangements between the United States and a foreign country also have a bearing on a claim arising in any particular country. In general such arrangements follow the pattern as set forth in Article VIII, NATO Status of Forces Agreement.[34] Other similar treaty provisions are contained in the Japanese Administrative Agreement[35] and the Bonn Conventions with Germany.[36] Under such treaty provisions, claims arising out of the performance of official duties are processed and adjudicated by the foreign or receiving state according to its laws and procedures. Only when the claim arises out of a nonofficial act would it be processed under the previously named Federal statutes and regulations. In each of the treaties there is a provision that precludes recovery from the individual wrongdoer in a foreign court if his act was in the performance of official duties. The degree of protection an individual has from suit in a local foreign court depends upon the agreement, or lack of agreement, between the United States and the country concerned.

Thus, it appears that as a result of treaty arrangements, and a reluctance on the part of United States citizens to litigate in foreign courts, there is little likelihood that a service doctor will be sued in a foreign court.

EMERGENCIES

The Federal Civil Defense Act,[37] which became effective on 12 January 1951, in effect suspends the coverage afforded under the provisions of the Federal Tort Claims Act in the event of a national emergency, as will be seen from section 2294 thereof which provides:

> The Federal Government shall not be liable for any damage to property or for any death or personal injury occurring directly or indirectly as a result of the exercise or performance of, or failure to exercise or perform, any function or duty, by any Federal agency or employee of the Government, in carrying out the provisions of this title during the period of such emergency. Nothing contained in this section shall affect the right of any person to receive any benefit or compensation to which he might otherwise be entitled under the Federal Employees' Compensation Act, as amended.

It will be seen that this statute excuses the Government from liability for damages or injuries occurring as a result of the performance of, or failure to perform, *any function or duty* by any Federal agency or employee of the Government in carrying out its provisions *in an emergency,* and the United States has not waived its immunity from suit under such circumstances.

MALPRACTICE INSURANCE

There are relatively few insurance companies that will write malpractice or medical professional liability insurance, and the rate is substantially higher for a doctor who desires surgical, x-ray, or shock treatment coverage than for the general practitioner. These distinctions apply equally to military doctors, but rates are generally lower for them than for civilian doctors. Presumably the main reason for this is the knowledge that Government lawyers will defend suits brought under the Federal Tort Claims Act.

The policy followed by The Surgeon General as to whether an Army doctor or nurse should carry malpractice insurance is that each one should decide this matter individually. The question arises occasionally whether the Department of the Army should pay malpractice insurance premiums to protect Army doctors; however, there is no known authority in existing permanent law or current appropriation acts that would permit the Army to pay such premiums out of funds appropriated by Congress. Further, if legislation should be proposed which would authorize the Army to pay malpractice insurance premiums, it appears likely that the Department of the Army would oppose its enactment. This is indicated by the position taken in 1956 with respect to H. R. 10577, 84th Congress, a bill "To provide for the procurement by

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the Government of insurance against risk to civilian personnel of liability for personal injury or death, or for property damage, arising from the operation of motor vehicles in the performance of official Government duties, and for other purposes." In opposing this bill the Department of the Army stated:

> The bill would provide a limited amount of liability insurance or alternatively virtually complete indemnification for a limited class of Federal employees subject only to the provision that in any such case the act of an employee forming the basis for such action must be found to be 'in the performance of his official duties.' It contains no standard of conduct for the officers and employees to be protected and no standard of responsibility for potential insurers.... The Federal Tort Claims Act, supra, now provides ample protection to third parties damaged or injured by the actions or omissions of Government workers acting within the scope of their employment.

The Department of the Army also stated that government procurement of commercial insurance would be unusual. It added, "It long has been the settled policy of the United States to assume its own risks (35 Comp. Gen. 391, 392)."

PATIENT'S RIGHT TO PRIVACY

There is a growing tendency to recognize the right of privacy as enforceable by an action in tort.[38] Under certain circumstances, tort action could be brought against a physician for violation of the patient's right to privacy, on the basis that "A person who unreasonably and seriously interferes with another's interest in not having his affairs known or his likeness exhibited to the public is liable to the other."[39]

The information that the doctor learns about the patient in the course of examination and treatment is in the nature of *privileged communication* and should not be revealed to unauthorized individuals without the specific consent of the patient. When a patient disrobes for any type of medical procedure, he does so for the professional benefit of the doctor, and unless he gives consent there should not be admitted either medical or nonmedical personnel who are not essential to the carrying out of the particular medical procedure.[40] To do otherwise is to violate the patient's right to privacy.

Written consent should be obtained in order to take pictures of the patient, and the pictures should be taken in such manner that the later use of them will not reveal his identity unless he has authorized in writing that it be revealed. The mere taking of pictures that are not authorized by the patient may constitute a cause of action against the doctor, even if they are never published.[40] This is true even though the pictures are for a worthy purpose such as advancing medical science.

AUTOPSIES

The performance of an unnecessary and unauthorized autopsy may subject the service doctor to a suit for damages by the next of kin or legal representatives of the deceased. The doctor might also be prosecuted for the violation of a criminal statute. The performance of an autopsy on the remains of a person who dies while serving on active duty in the military service is authorized under the conditions set forth in Army Regulations as follows:

> b. Autopsies.
>
> (1) Deceased military personnel. An autopsy will be performed on the remains of any person who dies in the military service while serving on active duty when the commander or the surgeon of an installation or command deems such procedure necessary in order to determine the true cause of death, and to secure information for the completion of military records.[41]

The same regulation requires written consent from the next of kin before performing an autopsy on a retired person or civilian who dies in a medical treatment facility or on a military installation. It also provides that an opinion defining "next of kin" should be obtained from the local judge advocate for the jurisdiction in which the installation is located. With respect to the performance of an autopsy on a civilian, the consent of the husband or wife or next of kin of the deceased is a prerequisite to the performance of an autopsy, unless the autopsy is performed, in accordance with the law, by or at the direction of the coroner or other authorized person.

The wrongful dissection of a dead body is regarded as a willful and intentional wrong against the person entitled to the possession and control of the body for burial, and a recovery may be had for the mental anguish resulting from such a mutilation. The unauthorized dissection is an interference with a legal right; the right to have immediate possession of the body in its condition at the time of death, and control for burial. A petition or complaint that alleges the right to a body, a refusal to deliver up the body on demand, and the performance of an unauthorized and wrongful autopsy thereon while it is withheld, states a cause of action. Further statutes in a number of states make it a crime to perform an unauthorized autopsy.[42]

TRENDS IN MALPRACTICE CASES

In recent years the public has become more informed concerning medical professional liability, and this may result in more claims against physicians and surgeons. The nature of the practice and procedures involved in some specialties make the doctors practicing in such specialties more likely to be sued. Based on the amounts recovered in some recent cases, larger claims may be expected to be made in the future.

The Law Department, American Medical Association,[43] made an analysis of 605 medical professional liability decisions reported in the United States from 1935 through 1955. The study included all published decisions regardless of the level of the court involved. Of the 605 cases, which involved 782 doctors, the greatest number had to do with surgical procedures. The next largest number concerned nonsurgical treatment and involved such incidents as breaking a hypodermic needle in giving an injection, prescribing an unofficial drug, or being negligent in removing a foreign body from the eye. Treatment of fractures and of burns also ranked high in the list of causes for claims.

THE DOCTOR IN COURT

There are numerous ways, some voluntary and others involuntary, in which a doctor may come before the Court in connection with his medical knowledge and practice. He may receive a subpoena to appear as witness for either party in a case about which he has personal knowledge, he may appear as an expert witness at the request of one of the parties to the suit, he may be suing a patient or employer, or he himself may be sued. In the latter case, the suit may be for breach of contract, for malpractice in rendering medical care, for assault and battery, for false imprisonment (where undue restraint of a patient is used), or for loss or damage to the property of a patient.

Questions the Court Considers

There are certain basic questions the Court must consider in an effort to determine liability in any case of negligence or malpractice. Some of the more important questions are:

1. Was there a duty on the part of defendant?

2. Was there an injury, with resulting damages, to the plaintiff?

3. Was the injury due to negligent action?

4. Did the injury result directly from the negligent action?

5. Did the doctor commit the negligent action or did he negligently omit to do something?

6. Does the doctrine of *res ipsa loquitur* apply under the particular circumstances?

7. What would a reasonable, prudent doctor have done under similar circumstances?

In seeking an answer to the last question the problem would arise as to what standards should be applied as to the reasonableness of the medical procedure used in the particular case. The practice of medicine requires the exercise of judgment based on knowledge. The question at issue in a negligence case is

whether proper judgment was exercised. The doctor is required to meet the level of *professional community practice,* in his own specialty, and *not* the level or skill of training possessed by the isolated or unusual practitioner.

The Doctor as a Witness

Before the doctor appears as a witness in a case he should assure himself that he is thoroughly familiar with the medical history and all clinical records of the case in issue. In a case involving a specialty or expert knowledge, he should review and establish firmly in his mind the medical principles that are recognized and accepted in the medical profession. In complicated cases he should take to court with him published medical authorities to be cited in his testimony in support of his position. He may anticipate that he will be rigorously cross-examined by opposing counsel as to the testimony he gives on direct-examination. A lawyer is trained to advocate the cause he represents. He seeks to make the most of any weak points which may appear in the testimony of witnesses on the opposing side of the case. The doctor should understand this and be prepared to meet it when he goes into court, rather than to indicate by his manner that he feels a reflection is being made upon his professional integrity.

It is important for the medical witness to take his time in responding to questions and to enunciate his answers clearly and distinctly. He should avoid long, complicated, technical answers to questions, and should speak in plain, understandable layman's language so that the judge and jury will better understand his testimony. The credibility of the witness, or the extent to which the Court and jury may believe his testimony, is very important in a law suit. It has a bearing when the Court instructs the jury on the evidence applicable to the case and the jury weighs the evidence by comparing the testimony given on one side with that presented by the opposing party.

SAFEGUARDS AGAINST MALPRACTICE CLAIMS

Although it is understandable that the trend in malpractice claims may cause the doctor concern, he must have the courage to act in line with his convictions as to what is best for the patient, using advanced methods of diagnosis and treatment where indicated, even though they involve certain risks. In doing this, there are certain standards or safeguards that, if observed by the practicing physician or surgeon, may avoid or at least reduce the number of medical professional liability claims.

The following are suggested ways in which the doctor may reduce the likelihood of suit without jeopardizing the welfare of his patient:

1. Avoid careless remarks about the medical treatment the patient may have received previously from another doctor.

2. Keep thorough, accurate, and complete medical records. These should include case history as well as clinical records.

3. Make thorough examinations of the patient, including all necessary laboratory tests, roentgenograms, et cetera, and record the results in the patient's medical record.

4. Obtain the confidence of the patient, establish rapport with him, and in general, improve the doctor-patient relationship as well as the relationship with the patient's family.

5. Do not experiment with unproven medicines, procedures, or technics, but adhere to proven and accepted medical principles and practices.

6. Do not guarantee cures or fixed degrees of improvement as a result of following certain prescribed medical treatments.

7. Explain the risks in surgical or medical procedures proposed, so that the patient understands the situation.

8. Obtain the written consent of the patient and the next of kin, in appropriate cases, keeping in mind that for the consent to be valid there must be full explanation of the procedures and the risks involved.

9. In dealing with a patient with a mental illness, obtain the written consent of the next of kin if at all practicable, even though written consent of the patient is granted, as the patient's mental capacity to give valid consent may be put in issue at a later date. The advisability of having such a patient examined by more than one doctor also should be considered. This will afford the doctor better protection, particularly in a case where restraint is used, as he may later be charged with false imprisonment.

10. Beware of the dangers involved in diagnosis and prescription by telephone, without seeing or examining the patient.

SUMMARY

Malpractice or medical professional liability claims are recognized throughout the United States. The doctor in government service is less likely to be sued in his individual capacity than a doctor in private practice, because of the protection afforded him by the Federal Tort Claims Act and other Federal laws and regulations. If the service doctor is sued in a state court for acts performed in a service hospital within the scope of his employment or in connection with his official duties, he may have the case removed to a Federal court for trial. Under procedures outlined in published Army Regulations, the Army doctor

may also make arrangements for the United States Attorney to defend him along with the Government. As a result, the rates for medical professional liability insurance are considerably lower for doctors in the Federal service than for those in private practice. The Surgeon General, Department of the Army, follows the policy of leaving it to each Army doctor to decide as to whether he should carry insurance. There is no current authority for payment of insurance premiums out of funds appropriated by Congress, and it is the policy of the United States to assume its own risks.

The patient's welfare should not be jeopardized through a reluctance on the part of the doctor to prescribe and render necessary medical treatment in an effort to protect himself from a possible malpractice claim, but there are safeguards that, if followed, will greatly reduce the likelihood of malpractice claims.

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BATHING: A CUSTOM AND PASTIME

"During the Middle Ages, the attitude of the church was such that bathing fell into disrepute except for certain religious rites. People rarely bathed, and in order to free themselves from objectionable body odours, they would anoint themselves freely with various types of perfumed creams and powders.

"It was not until the 18th century, when an ever-growing awareness of the cause of disease and the need for bodily cleanliness, that bathing became once more an accepted custom. It is thought to have been introduced into England by persons returning from the West Indies where the tropical heat made bathing a necessity. Beau Brummell also played a large part in its acceptance, for his example was followed by the Prince Regent and his entourage, and being approved by the leaders of fashion spread gradually down the social scale. It was, however, some time before baths were built in private homes.

"Thus frequent bathing has returned as a social custom and is now sometimes practised in many forms, varying from mud baths as a beauty aid to oatmeal baths for the treatment of skin diseases. It is my own personal opinion, however, that the quaint custom of certain Roman Empresses of bathing in milk will not be considered by the ladies of our society as a necessary adjunct to their natural charms."

—GRAEME CLARK, Med. V.
in *Sydney University Medical Journal*
p. 70, Vol. 46, 1956

HELI-MEDICAL SUPPORT

In A Mass Casualty Exercise

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WITH the advent of the atomic age came the necessity of revising the technic of warfare. Numerous as the revisions have been, none was more significant than the use of helicopters in combat during the Korean Conflict. Initially helicopters were employed for casualty evacuation, but they proved to be so effective for other services as well that tactical use of the transport helicopter followed. They provided conventional amphibious forces with a new kind of mobility, and triphibious assault became an innovation of modern warfare.

Just as in conventional amphibious assault, so also in triphibious assault, medical support was required. To provide this support, medical units had to be an integral part of and possess the same degree of mobility as the tactical force. A change was necessary, therefore, in the doctrine, organization, equipment, and supplies of medical units to be made a part of a helicopter-borne force. As changes were made, field tests and training exercises were conducted.[1,2]

In this article a presentation is made of a medical field exercise conducted as part of the continuing effort to improve medical support for amphibious forces and achieve needed changes in doctrine and organization of medical units attached to the Marine Corps.

EXERCISE OBJECTIVE

In latter May 1957 a unique medical field training exercise was conducted, having as its aim the testing and perfection of current technics as well as the development of new technics to be utilized in the management of casualties in amphibious warfare. Units from the Third Marine Division, the First Marine Air Wing, and the Amphibious Group, Western Pacific were members of the

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task organization. Although there were several phases to the exercise, only the pertinent medical features of one phase which best fulfilled the exercise objectives are recorded herein.

PLANNING AND ORGANIZATION

As plans for the exercise evolved it was apparent that several innovations were necessary. To be successful, a method had to be developed by which the simulated casualties could be processed with a maximum degree of realism. The personnel used as simulated casualties had to be of sufficient number to provide a realistic test of the medical facilities, and be trained to fully understand their roles. The units involved also had to be trained and, where indicated, modifications of technics and equipment made. In keeping with the training objectives, supplies had to be provided through appropriate channels so as to test this aspect of casualty management. Of equal importance, supplies had to be utilized to accomplish realism, yet costly medical items could not be expended worthlessly. The accomplishment of these tasks proved to be a significant feature of the exercise in itself.

Two hundred and fifty marine personnel were selected to act as simulated casualties. To ensure standardization and complete understanding, classroom instruction was given to them as to their role and conduct during the exercise. So that training in processing the simulated casualties would be uniform, descriptions of the type of injury were entered on one side of a plain shipping tag, and instructions to the "casualty" on the opposite side. As an example of this tag system, there was printed: "Fracture, right mid-tibia, bone protruding, moderate local bleeding, pain existent, skin pale." On the reverse side of the tag was the following: "Several minutes ago you were hit in the lower right leg by a shell fragment. The bone in your leg was broken. It is sticking out of the skin. There is bleeding. Lie on the ground until help comes. Do not move. You may call for help. Tell the corpsman you are thirsty and have pain." Such tags were prepared for each man serving as a simulated casualty.

The descriptions on the tags were prepared so as to test the corpsman's knowledge of what immediate action was to be taken. The descriptions also provided other observers with uniform information and thereby allowed them to render appropriate additional "treatment" in the course of evacuation. The information was used to establish an evacuation priority, the rightness of which was later checked and verified. The correctness of the treatment given was also assessed. As permitted, the medical officer used "casualties" as teaching aids in medical or surgical management. An attempt was made to realistically proportion the injuries specified on the tags, as to the extent and type, using available references as guides.[3,4] To exercise and instruct graves

registration personnel in the proper handling and disposition of the dead and their records, appropriate tags were made out.

It is noteworthy that during the exercise the instructions were zealously followed by the marine personnel acting as casualties. This co-operation, attributed in part to the pre-exercise training, contributed immensely to the success of the exercise.

The plan of the exercise necessitated the use of emergency medical teams which, by virtue of their role, were to be airborne by helicopter. These units were to be transported to the area where a large number of casualties were located, and there establish a sorting and evacuation station. Each team was comprised of 1 medical officer, 12 corpsmen, and 4 marines. The medical personnel were to provide emergency care, and the medical officer, in addition, was to establish a priority of evacuation. The teams were to be equipped with emergency medical supplies of sufficiently small amount to permit a high degree of mobility. Resupply was to be a critical feature of this aspect of the exercise. In accordance with existing operating procedures, supplies were to come from a medical unit supporting these teams. In this exercise a collecting and clearing company of the medical battalion was the medical unit having the responsibility of supporting and resupplying forward aid stations and, in this instance, the emergency medical teams. This company also provided a higher level of treatment in the chain of evacuation.

The collecting and clearing companies of the medical battalion are small mobile field hospitals having a 60-bed holding capacity. In conventional amphibious operations, they are manned by 4 medical officers, 1 medical service corps officer, 70 corpsmen, and 22 marines. Thirty-six of the hospital corpsmen are organized into a collecting section, and the remainder are allotted to the clearing section. Some of the basic equipment in these units includes surgical sets, sterilizers, a roentgen-ray unit, laboratory equipment; and blood collection, storage, and donor apparatus. Although there are many other medical items of equipment, these suffice as an indication of some of the components which, in their entirety, make up the hospital. The weight of this basic medical equipment is over 13,000 pounds. In addition, marine organic components exist such as a galley, a field shower, generators, a mobile operating room trailer, and vehicles, the majority being ambulances, which together make the hospital a self-contained functioning unit.

Well-organized as these collecting and clearing companies are for conventional amphibious warfare, in their entirety they are not capable of being transported by helicopter. Modifications in the personnel structure and of the equipment were therefore necessary for this exercise.

The officer personnel allotment was not altered. Marines, such as the company first sergeant, the electricians, wiremen, and clerks, were included, but vehicle drivers were excluded. Sixty-six navy corpsmen comprised the clearing or hospital section of the company. The collecting section, as such, was deleted. The men were organized into two tent teams of 11 men each, and a helicopter unloading team made up of the remainder. Each tent team was responsible for the erection of two of the four hospital tents. The unloading team moved the supplies and equipment from the landing site to a stockpile area selected near the tent in which the equipment would be placed. The helicopter unloading team was directed by a chief petty officer. Organized in this way, the expeditious establishment of the hospital was possible.

The hospital corps personnel were further organized into hospital sections. These included an admission ward, a shock section for management of preoperative and postoperative care, a sterilization section responsible for preparing sterile surgical packs, a surgery, a laboratory, an orthopedic and casting section, a medical storeroom, personnel and records section and ward sections.

The modification of the equipment was by far the most difficult, for it was not designed originally with the capability of being airborne. None of the vehicles were transported. The galley was not taken, "C" rations being carried instead. The organic 9.4-KVA generators, each weighing 1,870 pounds, were replaced with four 2.5-KVA generators, each weighing 440 pounds. These smaller units were capable of providing the necessary power for lighting special apparatus of the operating room, roentgen-ray equipment, blood refrigerators, and other necessities. Previous publications[2] indicated, and prior testing confirmed, the effectiveness of these small generators. Thirty-two 12-foot tent poles, used for tentage and camouflage nets, were not lifted by helicopter because of their awkward size and hazard to flight. However, subsequent trials with a sectioned, sleeved, tent pole which can be taken apart and transported by helicopter externally, made this artificiality of little significance. The longer poles have been transported internally during other field exercises, but internal loads were excluded in this operation. The roentgen-ray unit organic to the company, consisting of a tube assembly and apparatus, a roentgen-ray table, developing tanks, a darkroom tent, et cetera, which weighed approximately 2,500 pounds, was not carried in this exercise. Instead a smaller, more portable unit was carried. A polaroid developing apparatus was used. The composite weight of this equipment was 500 pounds. In tests performed prior to embarkation, it was found that the films obtained, though not optimal, were adequate in quality. The time needed to develop

a film with this equipment was two minutes, as opposed to 20 minutes required by the conventional equipment. Other deletions included 10 of the 12 authorized litter mattresses, with a saving of 375 pounds; and a traction table, with a conservation of 110 pounds. Although the authorized wood and canvas cots were carried in this phase of the exercise, in a subsequent phase aluminum pole litters with air mattresses were used satisfactorily. The canvas cots authorized weighed 1,430 pounds, whereas an equal number of stretchers weighed 840 pounds. Though relatively meager, these modifications of the equipment did serve to make the company more readily transportable by helicopter.

Deletions and changes in the equipment alone were not enough, for there also existed a requirement that the supplies be loaded in such a manner as to permit expeditious handling when moved by helicopter. This requirement was met by having all cargo carried externally. The more than 27,000 pounds of equipment and supplies were placed in loads, each not exceeding 700 pounds, to permit transport by the type of helicopter used. All cargo, with the exception of a single internal load, was prepacked in rigid aluminum heli-baskets. These baskets measured 3 feet 3 inches by 4 feet by 2 feet and weighed approximately 100 pounds. They were collapsible and equipped with skids or runners on the underside. By means of a hook from the underside

Figure 1. Initial supply block being heli-lifted ashore.

of the helicopter, rigged to pickup baskets, engagement with a sling attached to the basket was possible. A rapid pickup by a hovering helicopter resulted (fig. 1).

To assure a proper sequence of arrival and thereby avoid confusion and loss of time at the unloading site, it was mandatory that serialization of the supplies and equipment be made. The tents, poles, camouflage nets, and tools necessary for tent erection, were contained in the 13 initial cargo loads. Subsequent loads contained the equipment of each hospital section. Following the arrival of this equipment, the initial supply block organic to the company was transported. The last heli-lifted items of cargo were the "C" rations. These were taken in place of "B" rations and the galley, thus additional weight was diminished. In this manner, observing a priority arrangement in debarkation, a predicted arrival of supplies and equipment was achieved. A total of 53 external loads were required. Because of its delicacy and the possibility of damage the roentgen-ray tube assembly apparatus was the only internal load. By using exclusively this external means of cargo transport, it was possible to pick up a loaded heli-basket in less than one and one-half minutes and unhook one in a matter seconds.

Augmentation and replenishment of medical supplies using helicopters was one of the major aims of the exercise. The resupply for the collecting and clearing company came from the Medical Supply Section of the Medical Battalion. In the exercise this section was embarked aboard ship. Since amphibious supplies were prepared in predetermined assemblies, as is standard practice,[5] it was not unduly difficult to modify these assemblies into appropriately sized loads so they could be fitted in heli-baskets. These were serialized so that in any given basket it was known just what items were present. Serialization also allowed any component part of the resupply to be sent independently, had it been desired. Twelve heli-baskets were required to accommodate these supplies. Anesthesia gases, intravenous fluids, drugs, splints, litters, blankets, et cetera, were all resupplied successfully by this means.

One last innovation was necessary for the exercise. To provide realism for training purposes and so that some basis would exist for requesting a resupply of medical material, supplies had to be utilized; however, the expenditure of costly medical items was unjustified. This problem was resolved by establishing storage areas marked "used medical supplies" in each medical facility.

As each simulated casualty was treated, the actual supplies which normally would have been expended were placed in the provided storage area without opening or unwrapping. These constructively expended supplies were not used again during that phase of the exercise. Using this innovation the "expenditure" of medical supplies to provide realism and test resupply was accomplished without needless wastage of medical material.

Having satisfied the pre-exercise requirements of organizing and training the involved units, as well as having attempted to make appropriate modifications where possible in personnel employment, equipment, and supplies, that portion of the exercise to be discussed below was begun.

CHRONOLOGY OF THE EXERCISE

Units of the Third Medical Battalion were embarked aboard the U. S. S. *Tulare* (AKA 112) a cargo ship having a heli-deck. On the day of the exercise the ship was anchored approximately 2,000 yards offshore. At the first light of dawn on 26 May 1957 personnel and equipment of "D" Company, the collecting and clearing company utilized in this phase of the exercise, were debarked from the U. S. S. *Tulare* by helicopter. The time required for movement of the personnel was 23 minutes. Upon being landed ashore at a preselected site, erection of the hospital was begun (fig. 2). This company became fully established and camouflaged and was ready to process casualties in less than three hours. The ship-to-shore movement was accomplished using 11 helicopters (HMR(C)-162 and HMR(L)-163.) Personnel, basic equipment, and organic supplies, including the initial supply block, were transported ashore. The movement of cargo required 1 hour, 45 minutes.

Figure 2. Arrival of medical supplies ashore as hospital erection proceeds.

At a predetermined time 250 simulated casualties were introduced into the play of the problem. These "casualties" had each been given a casualty tag prior to the exercise which designated their injury. When directed, the "casualties", *en masse*, began their roles. The cards were prepared in a way that made it necessary for 75 per cent of the cases to be evacuated. These were proportioned 75 per cent litter cases and 25 per cent ambulatory cases. Approximately 15 per cent of the cases were designated as minimally injured, so evacuation for them was unnecessary. Another 15 per cent of the casualties were destined to succumb initially or subsequently in the course of evacuation or treatment.

Immediately after being notified of the "catastrophe" the emergency teams were dispatched to the areas. Instructions in self aid and "buddy aid", which had been given previously, ensured that emergency cases would receive treatment prior to the arrival of the emergency teams. Upon arrival of the emergency teams, the casualties were sorted, given first aid (fig. 3), and priorities for evacuation were established (fig. 4). This aspect of the exercise, as has been stressed by others,[4] was a significant feature. Litter bearers were used to collect the "injured" and bring them to the triage station. Helicopters were used as a primary, though not sole, means of evacuation to "D" Company. Helicopters were used exclusively to transport "casualties" from the mass casualty site and from "D" Company to the U. S. S. *Tulare* (fig. 5).

Those "casualties" taken to "D" Company were "treated" by giving first aid, managing shock, and performing minor surgery. Plaster casts were applied in certain cases for training purposes. Individuals were taken to major surgery, and actually prepared and draped for surgery. Surgical packs, previously prepared and packed in chests, were opened, resterilized, and placed in readiness for use. In some instances an actual time lapse was allowed to simulate performance of surgery. Diagnostic laboratory and roentgen-ray studies, both simulated and actual, were performed. When supplies were expended, in the manner previously described, a resupply was requested.

Aboard the U. S. S. *Tulare*, the headquarters, "A," and portions of "B" Companies of the Medical Battalion were located. These units served to augment the medical personnel of the ship. Additional supplies were brought aboard for each of the ship's three battle dressing stations. In the exercise, with this augmentation, it was possible to designate the U. S. S. *Tulare* as a hospital ship.

The division Medical Supply Section prepared the resupply items in heli-baskets. These were heli-lifted from the ship to "D"

Figure 3. Treatment by members of the Emergency Medical Team.

Company upon request. "D" Company further served as the source of supply for the emergency medical teams in the disaster area. Medical supplies for these teams were also heli-lifted.

"Casualties" evacuated to the ship included those requiring additional treatment beyond that which had been received at "D" Company and those who required hospitalization by virtue of their type of injury. One hundred and one "casualties" were

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Figure 4. Casualties being sorted in the "disaster area" prior to evacuation by helicopter.

Figure 5. Arrival of a "casualty" aboard the U. S. S. Tulare.

evacuated to the U. S. S. *Tulare*. Many simulated casualties, therefore, required helicopter transportation more than once. As the stretcher cases arrived, they were lowered from the helideck to the sorting station (fig. 6). At this station, if the "casualty" had not already been stripped of his belongings, this was done. From the sorting station he was routed to one of the three battle dressing stations (fig. 7) where additional therapy was given. As ashore, the utmost realism was observed, and in a

Figure 6. The sorting station aboard ship.

similar way supplies were "expended." Once treatment had been rendered, the patient was placed at bed rest. Hospital charts were maintained, and the patients were even fed in bed.

Casualty reporting was another aspect of this operation which was highly stressed. Because the aim of this article is primarily directed toward the medical aspects of this phase of the exercise, further mention will not be made except to note that innovations were utilized and tested.

The exercise did not cease until several hours after nightfall so that a test of night operations could be made. During the exercise a total of 234 "casualties" were heli-lifted, and a total of over 46,000 pounds of cargo were carried by helicopter.

DISCUSSION

Military commanders have long recognized that superiority in battle can be achieved through rapid movement of their personnel, equipment, and supplies.[7] Greater dispersion of forces as is dictated by nuclear warfare has increased the demand for mobility of combat elements. Not only must the combat troops have this capability, but it is mandatory that medical supporting units likewise possess the ability to be displaced readily and rapidly. In triphibious warfare desired mobility for medical elements can

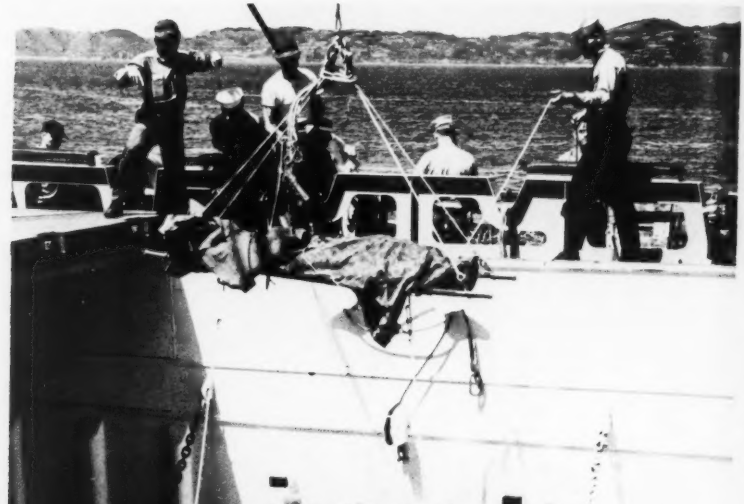

Figure 7. Lowering a "casualty" from the main deck to one of the battle dressing stations.

be achieved by using helicopters. As a result, medical units with the Marine Corps have been using and developing new technics to adapt themselves to the capability afforded by the helicopter. During the Korean Conflict the Marine Corps used helicopters extensively for casualty evacuation. The Army Medical Department also has utilized helicopter support for casualty

evacuation.[8] In triphibious operations, however, casualty evacuation is but one aspect of the medical aid that must be rendered. The portion of the exercise discussed in this article presents some of the other aspects.

This article is believed to be one of the first reporting a major field exercise of such magnitude having a primary objective of medical technics to be used in casualty management. Although there are frequent maneuvers and field operations in which medical companies, and at times an entire medical battalion participate, the prime aim of such exercises is tactical. This field problem then was indeed unique. Moreover, it is believed that this is the first medical exercise reported in which an attempt was made to simulate treatment realistically, process casualties and their reports, evacuate selected individuals as far as the seaward echelon, and there continue the play of the problem abroad ship, thus exercising all levels of medical support. That such an exercise was of inestimable value cannot be contested, and that new knowledge was gained can be conceded. Some of the modifications made in the equipment of the medical company cannot be considered original for they have been advocated previously by others.[1,2] The realistic utilization of these and other modifications and innovations set forth in this article were developed for this exercise by the joint efforts of Navy and Marine Corps personnel of the Third Marine Division, The First Marine Air Wing, and the Amphibious Group Western Pacific, working together toward the common goal of enhancing the effectiveness of medical support for those who in the future may be engaged in amphibious battles.

SUMMARY

In this article an attempt has been made to present some of the medicomilitary features of a recently conducted field medical exercise. Prior to the exercise, classroom training was given to marines who served as simulated casualties. Modifications were made in personnel, organization equipment, and preparation of supplies so that greater mobility would be achieved and helicopter movement made possible. Innovations were introduced in the use of medical supplies. Helicopter-transported emergency medical teams were organized and equipped to provide emergency care for a large number of casualties suddenly introduced into the exercise. Transportation by helicopter and establishment of a medical company clearing section, sending supplies to the company by helicopters, realistically processing simulated casualties through the company, seaward evacuation of "casualties" by helicopters, and subsequent treatment aboard ship were accomplished. The details have been described with the aim of providing data of interest to help others in planning similar future exercises,

and with the hope of stimulating further needed modifications for amphibious medical support.

CONCLUSION

To ensure that medical care will be adequate to keep pace with changing concepts of amphibious warfare, additional exercises of like character and a continuing revision of the organization and equipment of the existing medical units with the Fleet Marine Force are necessary. Future planning should be directed toward the goal of creating a complete self-contained medical unit capable of rendering definitive care and able to be transported by helicopter.

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CURLING'S ULCER

"Evidence of gastrointestinal (usually duodenal) ulceration was seen in 20 out of 1,000 patients hospitalized for burns over a period of 78 months. The ulceration was found at autopsy in 17 of the 80 patients who died; it was accepted as the immediate cause of death in 4. The concentration of uropepsin in the urine was higher in the patients with the more severe burns, and this was associated with high concentrations of pepsin and hydrochloride acid in the gastric juice.

—ROBERT P. HUMMEL, Capt., MC, USA,
GERARD F. LANCHANTIN, 1st Lt., MSC, USA,
CURTIS P. ARTZ, Lt. Col., MC, USA
in *Journal of the American Medical Association*
p. 141, May 11, 1957

Clinicopathologic Conference

U. S. Naval Hospital, Oakland, Calif.*

CHEST PAIN

Summary of Clinical History. A 46-year-old man was admitted to this hospital for the second time on 20 July 1955 complaining of severe, oppressive anterior chest pain of short duration, and with a history of edema of the legs, dyspnea, and orthopnea of one month's duration.

The final illness dates back four years, at which time the patient experienced his first episode of transient wheezing, dyspnea, and hemoptysis, with a recurrence nine months later, for which he was hospitalized here. At that time he was found to have left heart enlargement, hepatomegaly, and pulmonary congestion. Despite a 12-hour episode of left upper quadrant pain, myocardial infarction could not be unequivocally diagnosed. Electrocardiograms showed frequent ectopic beats and inversion of the T wave in leads I, V_5, and V_6.

Following discharge, the patient remained in good health until several months before his present admission, when he began to develop effort angina and exertional dyspnea. Outpatient department records describe the appearance of a grade II apical systolic murmur and electrocardiographic demonstration of a right bundle branch block. In the month prior to admission, his symptoms increased and edema of the legs developed.

Past history included "flu" in 1917, tonsillectomy and adenoidectomy in 1932, pleurisy in 1939, and chronic alcoholism in the past. There was no history of acute rheumatic fever. The patient retired six years ago, not because of physical disability.

*Rear Adm. John Q. Owsley, MC, USN, Commanding Officer. From the Medical Service, Capt. Robert O. Canada, MC, USN, Chief.

Physical Examination. On admission the patient looked both chronically and acutely ill, and his skin was ashen with both pallor and cyanosis. His pulse was rapid and regular, except for frequent premature contractions. Blood pressure was 110/60 mm Hg. Examination of the chest revealed wheezing, and crepitatant rales were present in both bases. The heart was described as greatly enlarged, with a grade II precordial systolic murmur; a gallop rhythm was noted. There was massive edema of the legs. No evidence of thrombophlebitis was noted on admission. The remainder of the physical examination was not remarkable.

Laboratory Studies. Complete blood cell counts and urinalysis were normal. Blood urea nitrogen was 22 mg per 100 ml. Roentgenograms and electrocardiograms are presented in the discussion.

Course in Hospital. The patient was initially treated for his congestive heart failure with a low sodium diet, digitalis, quinidine, morphine, oxygen, and diuretics. Despite this therapy, he continued to manifest more congestive failure with recurrent bouts of shock, hemoptysis, fever to 103°F, and rapid pulse with frequent premature contractions. He developed thrombophlebitis in his right leg during hospitalization, and was subsequently anticoagulated. A slough ensued following the use of Levophed (brand of levarterenol bitartrate) in his arm, and he was given penicillin, streptomycin sulfate, and Terramycin (brand of oxytetracycline). He developed signs of fluid in the right thorax and consolidation at the right lung base. Death occurred on the 36th hospital day, and was preceded by apneic episodes and disorientation.

DISCUSSION

Doctor Burke:* Was there ever any ascites or liver enlargement?

Doctor Reifenstein:** Apparently liver enlargement but not ascites, in that his liver was palpable on admission. At least ascites was not mentioned in the report.

Doctor Strutner:*** The only murmur was this apical systolic murmur?

Doctor Reifenstein: Yes.

Doctor Sorenson:**** Was there any evidence of vitamin deficiency brought on by his previous alcoholism?

Doctor Reifenstein: There are two things that one can mention about that. First, that the tongue, lips, and skin were described as normal.

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*Lt. Erwin L. Burke, MC USN, Intern.
**Capt. George H. Reifenstein, MC, USNR, Head, Cardiology Service.
***Lt. Leo A. Strutner, Jr., MC, USNR, Medical Service.
****Lt. Robert I. Sorenson, MC, USN, Intern.

Second, according to his history he had been a chronic alcoholic but had stopped some years before his last admission here. So I think we could eliminate that.

Doctor Cuttle:* Was there any evidence of prior thrombophlebitis?

Doctor Reifenstein: Apparently not on admission. The man had massive edema but did not have leg tenderness. It was looked for. He did have marked congestive failure, a rapid pulse, hemoptysis, spikes of fever and elevations of his pulse rate, and repeatedly went into shock, which occasioned the use of Levophed. I don't think there's much question but what the patient was considered to have pulmonary embolism with pulmonary infarction. One of the problems was the origin of emboli.

Doctor Dean:** I was wondering if the thrombophlebitis resulted from the administration of Levophed?

Doctor Reifenstein: He had a thrombophlebitis in the lower extremities before the slough appeared in the upper extremity; the Levophed was given in the upper extremity.

Well, let us try to summarize this case. There is little doubt that this man had both pulmonary and cardiac disease. Let us discuss briefly the types of pulmonary disease and cardiac disease which he might have had. Against rheumatic heart disease is the absence of history, characteristic murmurs, and atrial fibrillation. In favor of the diagnosis is the patient's age, but there is insufficient evidence to make this diagnosis. He had no evidence of syphilitic heart disease; there were neither murmurs nor peripheral signs to suggest aortic valvular disease. Right bundle branch block, questionable atrial enlargement (as evidenced by peaked P waves), and right ventricular hypertrophy suggest interatrial or interventricular septal defect, but the history is that of sudden onset four years prior to death, with repeated transient episodes of illness, which is not characteristic of congenital heart disease. Beriberi heart disease is unlikely in view of the history of no recent alcholism plus the absence of other substantiating peripheral signs. There are no clinical features to suggest myxedema. The greatly enlarged heart, and episodic rather than relentless course, mitigate against constrictive pericarditis (figs. 1 and 2).

Coronary heart disease remains a good possibility in a man with angina pectoris, electrocardiographic changes, progressive congestive heart failure, and episodic chest pain. Our patient may have had one or more myocardial infarctions to account for his right bundle branch block and his deformed QRS complexes, and again, recently, prior to hospital admission.

Strongly suggested by this history, is pulmonary heart disease or cor pulmonale. The patient may have had an episode of pulmonary infarction with wheezing dyspnea in 1951, again nine months later,

*Capt. Tracy D. Cuttle, MC, USN, Medical Service.
**Lt. Phillip J. Dean, MC, USNR, Intern.

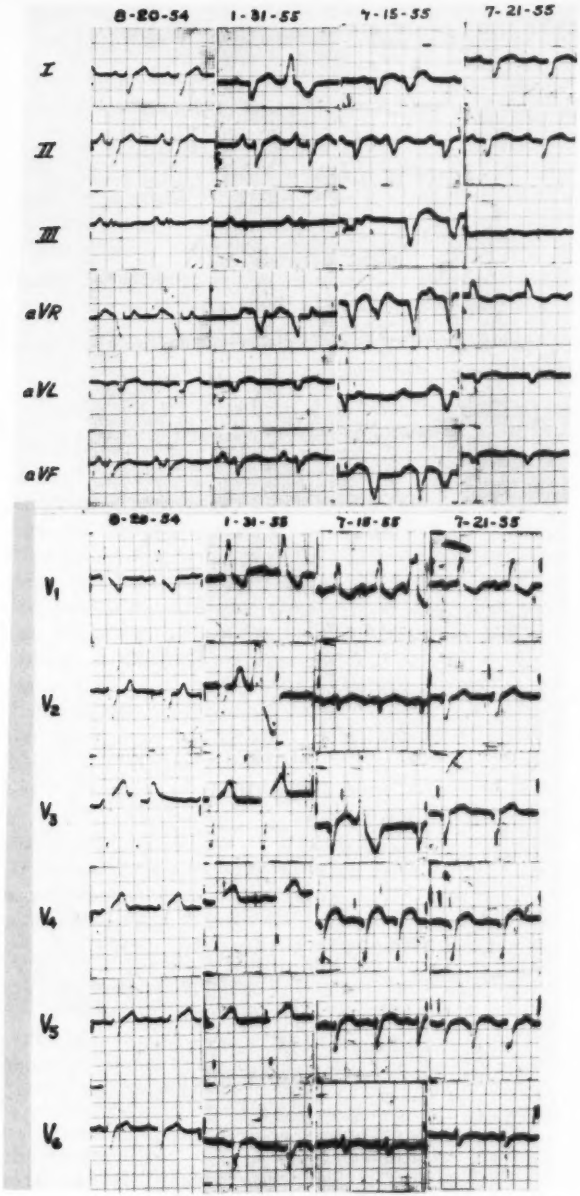

Figure 1. Electrocardiograms made on dates shown, mounted side by side for comparison.

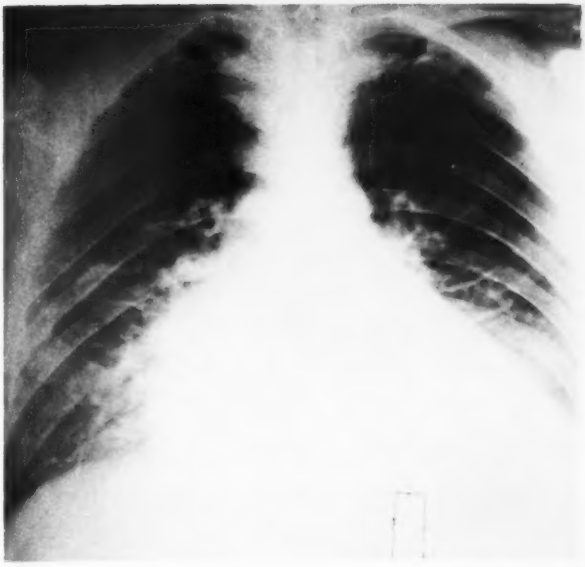

Figure 2. Roentgenogram on admission showing grossly enlarged heart and possible pericardial effusion.

and then shortly before admission. Indeed, everything needed to make a diagnosis of pulmonary infarction is present, even to an x-ray shadow and the thrombophlebitis in the lower extremities. It is a clinical fact that quite often people who have antecedent heart disease may be precipitated into circulatory failure by repeated small to moderate-sized pulmonary infarctions, emboli, or thrombi; the latter perhaps arise in situ rather than come as emboli. Sometimes it is very difficult for the pathologist to tell whether a clot was an embolus or was formed in situ in pulmonary vessels. It may have occurred prior to thrombophlebitis. As many as 25 to 30 per cent of consecutive autopsies in some series have shown pulmonary infarction. This is true when full dissection of the veins of the lower extremities is carried out. Most of the textbooks warn of hip or pelvic thrombophlebitis in the presence of pulmonary infarcts. When this happens there usually is thrombophlebitis, or if you wish phlebothrombosis, lower down in the extremity; in fact, I think there's some evidence that some of these may actually start in the feet and work up through the calf. And that may occur before we have clinical evidence of it. Cardiac failure may be the result of obstructing sufficiently the flow of blood from the right heart so that we get right heart enlargement, edema, and also shock. The patient probably did not have any of a variety of other causes of pulmonary heart disease such as silicosis, berylliosis, asbestosis, chronic tuberculosis, or Ayerza's disease. There is a form of so-called subacute cor pulmonale occurring with carcinoma, in which carcinoma of the lung,

either metastatic or primary, may be associated with sufficient lymphatic and vascular blocking to produce a picture of death from pulmonary heart disease. I do not think that is the situation here. If this man had pulmonary emboli with pulmonary infarction as the precipitating factor for his terminal failure, we have adequate sources for such in the lower extremities and might additionally have mural thrombi in the right heart. We might also have pulmonary thrombosis, perhaps dependent on some pulmonary vascular disease, pulmonary atheromatosis, or some unusual type of pulmonary vascular lesion which helped to contribute to the terminal picture. This leads us astray in the field of periarteritis nodosa. I would say that this man probably had pulmonary infarction with repeated episodes possibly due to pulmonary embolism and/or pulmonary thrombosis with enlargement of all parts of the heart, some evidence of right ventricular thickening as well as total enlargement of the heart, possibly left ventricular hypertrophy on the basis of antecedent hypertension (but which he didn't have during his last hospitalization), and coronary heart disease with possible old and recent myocardial infarction (figs. 3 and 4).

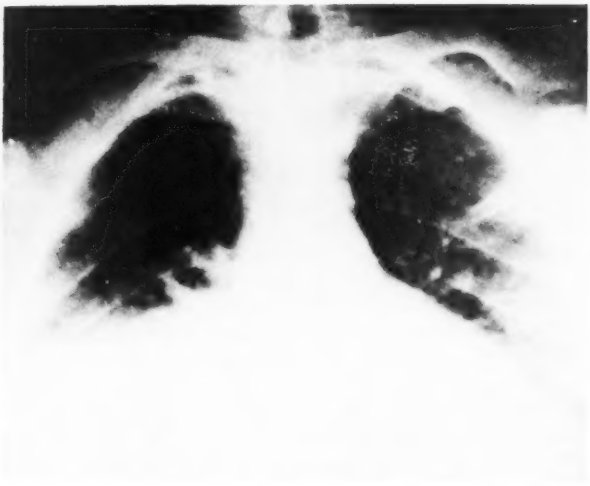

Figure 3. Roentgenogram one week after admission showing increased opacity on the right.

Doctor O'Connell:* Would anyone else care to tender a diagnosis other than those made by Doctor Reifenstein—Doctor Canada?

Doctor Canada: That pretty well covers the field. I would like to ask whether or not pulmonary infarction occurs in the absence of congestive failure? I was taught that one never sees pulmonary infarction without congestive failure. The lung has a dual blood supply. There is enough

*Capt. Hugh V. O'Connell, MC, USN, Chief of Pathology Service.

Figure 4. Roentgenogram four weeks after admission showing the marked pulmonary congestion.

collateral circulation through the bronchial arteries so that an infarct never forms unless the circulation is impaired, as in congestive failure. I have observed clinically what proved to be pulmonary embolism in young, otherwise healthy persons following fractures to long bones. This usually occurred about three weeks after the fracture, often after the patient was ambulatory. The onset was sudden with severe chest pain, cough, and at times hemoptysis. Roentgenograms of the chest showed a homogeneous density, usually in the lower lung field, and elevation of the diaphragm. If this is not infarction, what is the pathologic condition?

Doctor O'Connell: It's not uncommon to see in fracture cases coming to post-mortem examination, either directly related to their trauma or for concomitant reasons, to find bone marrow emboli in the lungs. Whether or not these will be large enough to produce an infarct is the question; apparently many of them are and they can produce pulmonary infarcts in the absence of myocardial failure in spite of the dual blood supply.

Doctor Sorenson: I've seen patients who had heart disease and sudden onset of left upper quadrant pain that was diagnosed as splenic infarct but who never came to autopsy to prove it or disprove it. I wonder if Doctor Reifenstein would comment on that?

Doctor Reifenstein: I don't know what caused the left upper quadrant pain, but most of the conditions I could think of that would produce splenic infarction were not associated with the patient's condition

during the following three years, and I am inclined to think that it was an episode of pulmonary infarction in which the pain was felt in the lower anterior part of the chest.

Clinical diagnoses:

1. Infarction, pulmonary
2. Phlebothrombosis, right leg
3. Infarction, myocardial

Dr. Reifenstein's diagnoses:

1. Infarction, pulmonary
2. Myocardial hypertrophy
3. Infarction, myocardium, old and recent

PATHOLOGIC FINDINGS

Doctor Johnson:* At autopsy this 46-year-old man appeared somewhat older than that. There was an area of dry gangrene of his forearm. There was a suggestive increase in the anteroposterior diameter of his chest, but this was not very marked, and the patient demonstrated pitting edema of his lower extremities. The right calf and thigh were 1 inch greater in circumference than the left.

The left pleural cavity was completely obliterated by firm fibrous adhesions, and the right had a few similar adhesions between the middle lobe and the lateral chest wall. There was 700 ml of bloody pleural effusion on the right. The heart and lungs were removed in toto from the body. There were numerous fingerlike projections of a velvety, soft material projecting from the mediastinal surface into the pleural cavity, and there was massive enlargement and dilatation of the heart, which included all chambers. The lungs were very heavy, the right weighed some 1,100 grams, the left 750 grams. The upper lobes were similar. There was some bullous emphysema at the apices and they, on cut section, presented a rather coarsely spongelike consistency. The lower lobes and the right middle lobe were similar in that there were multiple infarcts, as seen in the cross sections. Some of these infarcts had a gray-white, fibrous, firm appearance, appeared old. Others were more acute, having the consistency of liver and being of firm, dark red-brown appearance. The process was extensive in the right lower lobe, appearing to be a complete recent infarction of the entire lobe. On dissecting the vessels it was noted that the secondary branches of the pulmonary arteries to the lower lobes and the right middle lobe were filled with thrombi. Some appeared gray and fibrotic; others were dark red and apparently more recent. The larger vessels, however, grossly did not appear remarkable.

The heart weighed 750 grams. Grossly the coronary vessels were unremarkable. There was some slight atheroma but not a significant degree. There was a mural thrombus of the right auricular appendage. The most striking finding, of course, was the massive dilatation of

* Lt. Thomas S. Johnson, MC, USN, Resident (second year) in Pathology.

all chambers and the hypertrophy of the right ventricle. The right ventricle averaged 0.5 cm in thickness throughout. The left ventricle averaged 1 cm in thickness. The myocardium was somewhat flabby because of the enormous dilatation but otherwise remarkably homogeneous, glistening, and brownish tan. There was one small area on the posterior wall of the left ventricle that appeared slightly gray-white and fibrotic but this was localized.

The liver weighed 1,800 grams and grossly was of a nutmeg type. Further gross findings included 150 ml of ascitic fluid slight splenomegaly, and dilatation and blood clots in the periprostatic venous plexus. The vessels of the calf were not examined.

Microscopic examination of the posterior left ventricle at the area of fibrosis showed the myocardial fibers separated by extensive fibrous tissue. Diffusely throughout the section the fibers were separated to a certain degree by this fibrous replacement. In addition, the fibers showed numerous nuclei that are markedly enlarged and very blunted and bizarre in shape, and the fibers appear hypertrophied. The right ventricle showed the same changes. The hypertrophy of the right ventricular fibers was very impressive. There wasn't quite the degree of fibrosis, though it was present. Thrombosis could be demonstrated in the right auricular appendage. Figure 5 includes one of the acute

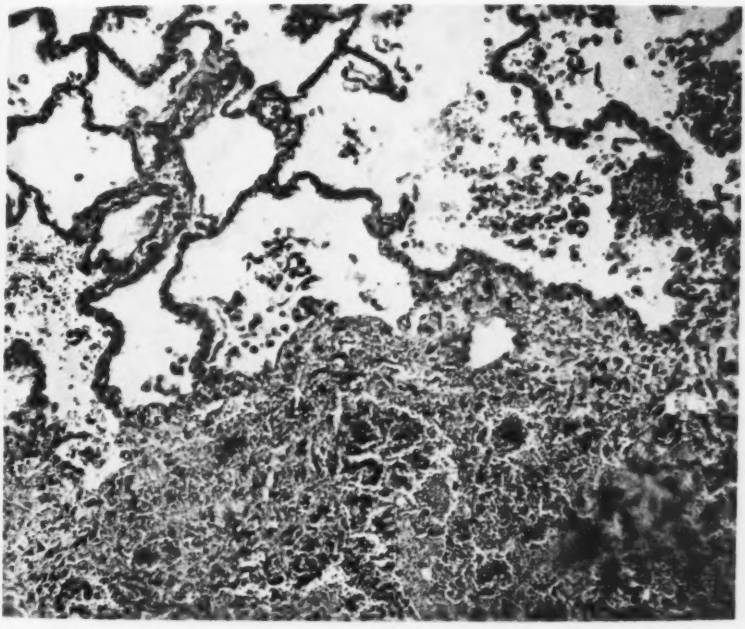

Figure 5. Photomicrograph showing sharp demarcation between an infarcted area and one of emphysema. (× 100)

pulmonary infarcts and shows a sharp margin between the infarcted area and the more normal area. Within the more normal area an emphysematous change may be seen. Many of the interalveolar septums are blunted and gnarled and the alveolar spaces are all communicating with one another. In addition, some of the vessels in this area are not infarcted. Notice the thickening of the arteriole-size vessels. This thickening appears to be, on greater magnification, a homogeneous eosinophilic material that obliterates the media of these vessels and does not appear to be an atheromatous sort of thickening (fig. 6).

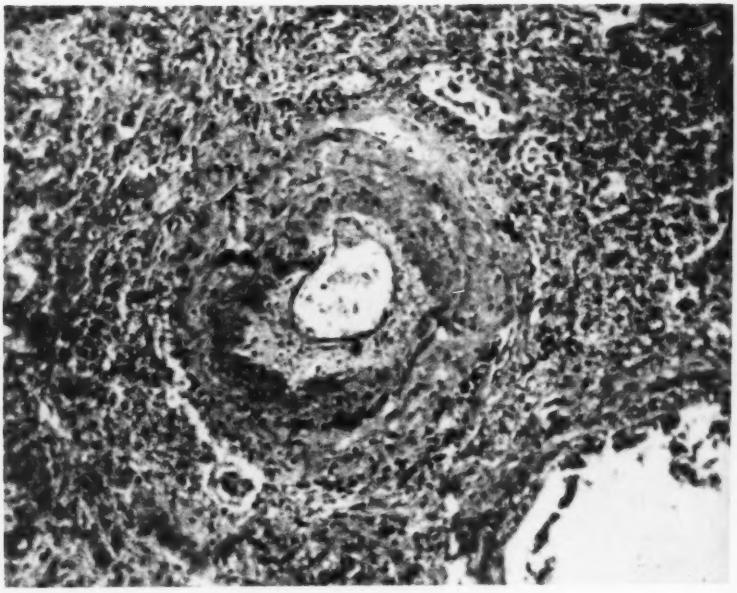

Figure 6. Photomicrograph showing marked sclerotic change in the pulmonary vessel wall. (× 300)

Figure 7 demonstrates a pulmonary arteriolar vessel occluded by a thrombus which has undergone organization and recanalization. There is fibrotic replacement of the normal pulmonary parenchyma entrapping numerous cells typical of heart failure. This represents one of the older infarcts. The fingerlike projections mentioned earlier extending into the right pleural cavity, interestingly enough, are small lipomata composed of mature fat with a border of condensed red and white blood cells. The liver shows a massive central necrosis of the lobules, but the lobular architecture is otherwise intact. The periprostatic vein reveal early organization of an ante-mortem thrombus.

In summary, therefore, we believe that this case represents primary pulmonary arteriolosclerosis with thrombosis and infarction. The

resulting pulmonary hypertension resulted in predominantly right cardiac disease and, eventually, intractable failure.

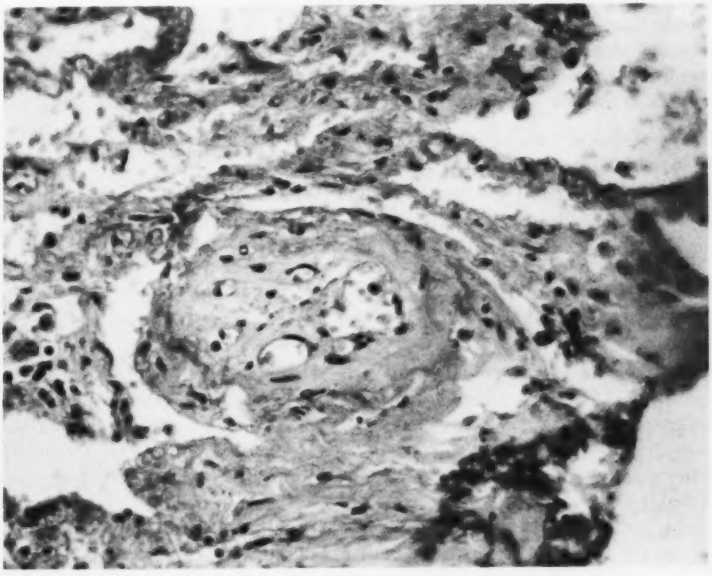

Figure 7. Photomicrograph showing thrombosis of one of the pulmonary vessels with recanalization. (× 450)

Doctor Canada: What is the condition of the arteries of the rest of the body?

Doctor Johnson: The systemic arteries, both large and small, show, as I mentioned earlier in regard to the coronaries, minimal atherosclerosis. The kidneys were normal and the penicillar arteries of the spleen were unaffected.

Doctor Canada: What about the bronchial arteries? Could you identify any of the bronchial arteries?

Doctor Johnson: No. We've been arguing about the differentiation of bronchial arteries from pulmonary arteries for a long time, but I don't think I can tell the difference.

Doctor O'Connell: I cannot tell either. One can by dye injection methods differentiate between them grossly but not by histologic cross sections.

Doctor Johnson: Any other comments or questions?

Doctor O'Connell: Well, that's our side of the case. We feel, putting all the evidence together, that this case meets the criteria of pulmonary arteriosclerosis. There was a notable lack of associated systemic

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arterial changes. The problem comes up of trying to rule out periprostatic venous thrombosis as a source of the pulmonary emboli. Many times, the veins of the legs or lower extremities are the source of emboli, but we feel that in this case the pathologic condition of the lung is of such a degree and extent as to have antedated any other thrombi or emboli. Terminally I think that he did have, from his right heart or auricular appendage, some more recent thrombi.

Pathologic diagnoses:

1. Pulmonary arteriosclerosis
2. Pulmonary thrombosis and embolism with multiple old and recent infarcts
3. Cardiac dilatation and hypertrophy with myocardial failure

Doctor Reifenstein: Usually I do not write in the report on an electrocardiogram that "these findings are absolutely diagnostic of a myocardial infarction," but instead say, "I cannot eliminate myocardial infarction," or "the findings are somewhat suggestive," or "rather suggestive," or "strongly suggestive of possible myocardial infarction." This probably is the result of my earlier practice in pathology. The relationship of abnormal electrocardiographic findings to pulmonary pathology is of great interest. Right bundle branch block is something rather commonly seen in right heart "strain." We think of it in acute pulmonary embolism where we see transient right bundle branch block, but in right heart enlargement as with, for example, interatrial defects, Ebstein's syndrome, pulmonary hypertension with an interventricular septal defect, patency of the ductus with an intermediate stage of reversed flow, it's not at all uncommon—in fact, in some of the atrial defects as high as 90 per cent of the cases may have right bundle branch block. I think the feature of greatest interest, purely from an electrocardiographic standpoint, is the loss of certain of the initial potentials in the precordial leads.

The occurrence of anginal distress in conditions associated with pulmonary hypertension is also of much interest, and in the case we have discussed today, there was no great evidence pathologically of coronary heart disease. Tinsley Harrison[1] particularly has drawn attention to angina of this type, and we have found it not at all uncommon in some of our patients with marked pulmonary hypertension.

Cases like this are most difficult to treat. When you can recognize that pulmonary infarction has occurred and do find thrombophlebitis, the tendency is to consider high radical surgery. I have seen two patients in whom ligation of the inferior vena cava had been done in the hope that the change in the lung was secondary to embolism from the lower extremities. In each case the patient died. I have seen one additional case in which the patient recovered, and in which I suspect that infarction was due more to embolism rather than to thrombosis.

Doctor Norris:* I'd like to say that the question of ligation of the inferior vena cava was considered on an hour-to-hour basis for quite a number of days and weeks, and the last report I had was the initial autopsy report that there was extensive (pelvic vein) thrombosis. We wondered if we shouldn't have done an inferior vena cava ligation. In view of these findings, I am glad that the decision was made not to do one.

*Capt. Frank T. Norris, MC, USN, Assistant Chief of Medicine.

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AMBIDEXTERITY IN SURGERY

"So often practice to the surgeon consists only of learning to tie knots, which the beginning surgeon assiduously practices. But how often is the practice extended to tying knots in the bottom of a container, or in the corner of a deep box? Tying a knot in relatively inaccessible areas tests the real skill of knot tying. The practice should be extended to suturing and grasping small pieces of thread in improvised situations at home, analogous to the so-called 'compromised situation' during surgery, which after practice and with perfection would no longer be a 'compromised situation.' The common instruments used in surgery should be handled and manipulated until their use becomes habit, so that they can be properly handled and used with ease, gentleness, and efficiency. This can never be fully developed at the operating table without jeopardizing, to some extent, the patient on whom one operates.

"The piano player who could use only the right or left hand well could be expected to execute only part of the interpretation of the music. The total interpretation requires the coordinated cooperation of both hands. Yet how often have we surgeons, in 'compromised situations,' wished we could use our other hand to suture, dissect, or grasp bleeders. With practiced ambidexterity the situation would no longer be compromised."

—JOHN R. DERRICK, M. D.
from Editorial in *Journal of Medical Association of Georgia*
pp. 341-342, July 1957

CASE REPORTS

Xanthoma Diabeticorum

ARTHUR S. LURIE, *Captain, USAF (MC)*

DIABETES mellitus is a disease of protean signs, symptoms and metabolic interrelationships. Xanthoma diabeticorum, a rare manifestation of diabetes mellitus, is a result of the hyperlipemia and hypercholesteremia due to the substitution of fats for carbohydrates as the primary source of energy. Occasionally a diabetic will first seek medical advice because of the eruption of the xanthoma. These are elevated, firm, yellow papules about 1 to 3 mm in diameter which may or may not have a red "halo" about their base. They may appear singly or in patches, usually on the extensor surfaces of the extremities, back of the neck, shoulders, upper and lower thorax, and abdomen (figs. 1 and 2). There is no pain associated with the eruption but there may be minimal pruritus. Histologically there is fibroblastic proliferation, foam cells (phagocytes with lipoid droplets), and the multinucleated Touton giant cells.

The disease was first described by Addison and Gull[1] in the year 1851. Ninety-seven cases were compiled from the literature by McCavack and Shepardson[2] in 1933. Thannhauser[3] and Thannhauser and Magendantz[4] completely reviewed the subject of the lipoidoses including xanthoma diabeticorum. Joslin and associates[5] mentioned the low incidence of xanthoma diabeticorum. Gumpel and Lipton,[6] Margolin,[7] and Spencer[8] published excellent case reports.

In the following case report of xanthoma diabeticorum the patient sought medical attention because of the skin eruption.

CASE REPORT

A 37-year-old supply sergeant with 14½ years of military service was admitted to this hospital with suspected diabetes mellitus. The patient stated that he was well until about 4½ months prior to his admission to the hospital when he had been treated with penicillin for an upper respiratory infection and sore throat. Three weeks later he had a recurrence, and treatment at that time was with Terramycin (brand of oxytetracycline hydrochloride) because of a previous mild penicillin reaction. Shortly thereafter the patient noted the onset of frequency of urination and increased thirst. His appetite remained the same. About

From U. S. Air Force Hospital, Schilling Air Force Base, Kans. Dr. Lurie is now at Boston City Hospital, Boston, Mass.

Figure 1. Lesions of xanthoma diabeticorum on the patient's back and neck.

three weeks prior to admission he began to note the appearance of "boils" on the back of his neck. One week later he noted the appearance of discrete, yellow, firm nodules which spread from his neck to his back, anterior part of his thorax, arms, and upper part of his abdomen. It is for this reason that the patient sought medical advice.

Past and family histories were noncontributory. There was no history of heart or kidney disease, diabetes, or tuberculosis. Systemic review was noncontributory except for the forementioned polydypsia and polyuria.

Physical examination on admission revealed an obese white man not in acute distress. His blood pressure was 135/95 mm Hg, and his pulse rate was 80 per minute. His skin was covered with elevated papular nodules, yellow in color, firm in consistency, and located over thorax, arms, back, and thighs. The head and neck were normal. The fundi were normal; pupils round, regular, and equal, and reacted to light and accommodation. The ears, nose, and throat were normal. An upper denture was present. The chest was clear to percussion and auscultation. The heart was not enlarged, sinus rhythm was normal, P-2 equaled

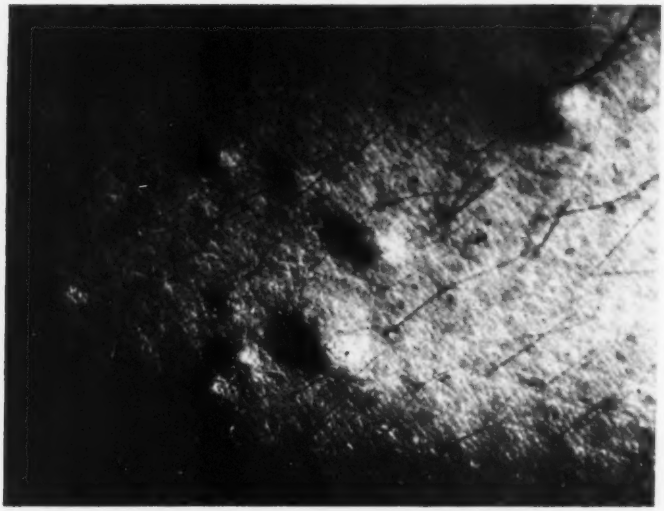

Figure 2. Enlargement of lesions of xanthoma diabeticorum in figure 1.

A-2, and no murmurs were audible. The liver and spleen could not be felt, or no masses were palpable. No hernia was present. There was marked inflammation about the prepuce. The back and extremities were normal. Neurologic examination was normal.

On admission the patient's fasting blood sugar was 244 mg per 100 ml. The serologic test for syphilis was negative. The total cholesterol level was 950 mg per 100 ml (cholesterol esters, 94 per cent). The patient's serum exhibited a marked milky appearance and it was impossible to obtain an accurate determination of the hemoglobin and total protein. Urinalysis revealed 4 plus sugar. The white blood cell count was 19,650 per μl, with a differential of 69 per cent neutrophils and 31 per cent lymphocytes. Roentgenographic findings of the chest were within normal limits. A skin biopsy was consistent with the diagnosis of xanthoma diabeticorum. An electrocardiogram was normal. The serum amylase was 32 units per 100 ml and the serum lipids were 7,780 mg per 100 ml.

The diagnosis of diabetes mellitus with associated xanthoma diabeticorum and cellulitis of prepuce was made. The patient was started on a 1,500-calorie diet (47 grams fat, 90 grams protein, 180 grams carbohydrates), Terramycin, NPH (neutral protamine Hagedorn) insulin, and insulin (U. S. P.). Morning fasting blood sugar levels were determined, and every four hours qualitative urinalyses were performed. One week after admission the cellulitis cleared and the Terramycin was discontinued. The regular insulin was discontinued 10 days after admission. The patient was finally maintained on 15 units of NPH insulin.

DISCUSSION

Because of the admission cholesterol value of 950 mg per 100 ml, the insulin requirements were carefully titrated to daily blood sugars to prevent the possibility of myocardial ischemia resulting from hypoglycemia and insulin shock (table 1). The patient was given a 1,500-calorie diet similar to that as proposed by Duncan,[9] and soon after the diabetes was brought under control the xanthoma gradually began to fade and regress. There was no evidence of lipemia retinalis. This latter condition may be found in cases of long standing hyperlipemia. The patient was discharged 21 days after admission on 15 units of NPH insulin. On discharge the total cholesterol had dropped to 340 mg per 100 ml and the fasting blood sugar was 82 mg per 100 ml. One month later the cholesterol was 338 mg per 100 ml and the fasting blood sugar was 85 mg per 100 ml.

TABLE 1. *Fasting blood sugar and cholesterol values*

Day	Fasting blood sugar (mg per 100 ml)	Cholesterol (mg per 100 ml)	Insulin	
			NPH	Regular
1 (Admission)	244	950	20	
4	280		25	20
7	200		40	45
10	160	545	35	10
15	122	340	20	
21 (Discharge)	82		15	
40	85	338	15	
55	78	240	15	

The milky or cloudy appearance of the serum is due to the hyperlipemia. It is expected that control eventually will be attained by diet alone. However, the patient will be maintained on small quantities of insulin to facilitate weight reduction and to impress him with the importance of the disease and of proper dietary restrictions.

In diabetes there is an increase in the mobilization, production, and transportation of the cholesterol fraction and neutral fats. The hyperlipemia and hypercholesteremia result in the skin eruption which is secondary to the lipemia occurring in diabetes mellitus.[4] Similar lesions, xanthoma tuberosum and xanthoma planum, occur in primary xanthomatosis. This is a systemic disease in which the skin as well as the viscera are involved.[5]

Hypercholesteremia may also be found in idiopathic hypercholesteremia, xanthomatous biliary cirrhosis, nephrosis, myxedema, prolonged hepatitis, obesity, Hand-Schüller-Christian disease, Niemann-Pick disease, Gaucher's disease, and during the last trimester of pregnancy.

SUMMARY

The case of xanthoma diabeticorum presented is an uncommon manifestation of diabetes mellitus, and is a result of the hyperlipemia and hypercholesterolemia associated with diabetes mellitus. The treatment and management is discussed.

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THE SURGEON AND HIS HOBBIES

"A good hobby, an avocation that appeals to the man or woman and that gives respite and enjoyment, is especially important to the surgeon with his unusual responsibilities and long hours. Avocations and hobbies are of all sorts and kinds. They vary from the sublime to the ridiculous. As long as they serve their purpose of giving congenial occupation in one's spare time it matters not what they are. Studying the theory of relativity may be at one end of the hobby spectrum, collecting epitaphs from moldy tombstones at the other. A sense of humor is of tremendous advantage, but a man without it can still follow a hobby but it will probably be very uninteresting to others. Of course, some hobbies are far more agreeable to the family and the neighbors than others. Landscape painting, stamp collecting, cooking, gardening and chess are less noisy than practicing on the bull fiddle or the trombone."

—ALLEN O. WHIPPLE, M. D.
in *Journal of National Medical Association*
p. 303, Sept. 1957

Acute Melioidosis

WILLIAM STEIN, *Lieutenant Colonel, MC, USA*
NGUYEN HOAI DUC, *Major, MC, Army of the Republic of Vietnam*
FREDERICK J. LOW, *Captain, MSC, USA*

MELIOIDOSIS, a glanders-like disease, was first described by Whitmore and Krishnaswamie[1] in 1912. Since then more than 300 cases have been reported in the medical literature, almost all occurring in the endemic area of the Far East.[2,3] Prevatt and Hunt[4] reviewed the literature, including three cases of proved systemic melioidosis in the Western Hemisphere. Two of these were in persons who had never left the United States,[2,5] and the other was in a man who had been out of the country only once.[6] The need for recognition of this disease is increased by important military commitments in endemic areas. The case herein presented was diagnosed and followed in the military hospital of the Republic of Vietnam.

CASE REPORT

A 40-year-old Vietnamese enlisted man was admitted to this hospital 25 September 1956, complaining of abdominal pain and diarrhea. The onset of his illness was sudden, with chills, fever, severe frontal and occipital headache, and anorexia. Prior to his admission he had been treated for typhoid fever (the admission diagnosis) with Chloromycetin (brand of chloramphenicol).

On admission to this hospital, the patient appeared acutely ill and dehydrated. His temperature was 103°F and remained elevated for five days. His pulse rate was 80 and regular, and his blood pressure was 130/85 mm Hg. Examination of the chest revealed sibilant rales at both bases. The heart was not enlarged to percussion, rate and rhythm were normal, and there were no murmurs or palpable thrills. The spleen was enlarged but not tender. There were no palpable abdominal masses, and the liver was not enlarged. The extremities were normal. Neurologic examination was negative. The patient's skin was clear throughout.

Urinalyses were positive for albumin, white blood cells, red blood cells, and fine and coarse granular casts. Urine cultures were negative. Blood smears were negative for parasites. Blood cultures were positive for Whitmore bacilli. Serodiagnostic tests revealed a negative Widal,

From Hospital Cong Hoa, Army of the Republic of Vietnam. Col. Stein is now assigned to U. S. Army Hospital, Fort Gordon, Ga.

negative Weil-Felix, and a positive titer of 1/320 for Whitmore bacilli. Sensitivity tests performed on the organisms isolated in blood culture revealed high sensitivity to combinations of Chloromycetin and tetracycline, and Chloromycetin and erythromycin. Sedimentation rate by the Wintrobe method ranged from 36 to 38 mm in one hour. Blood cell counts revealed a hypochromic anemia, with white blood cell counts of from 2,400 to 7,250 per μl and normal differential counts. Stools were negative for ova and parasites, and stool cultures were negative.

Repeated roentgenograms of the chest were within normal limits. A roentgenogram of the right knee revealed extensive demineralization of the diaphysis.

Treatment with Chloromycetin was initiated on admission, because typhoid fever was suspected. The patient's temperature remained elevated for five days and then decreased by lysis. Chest rales disappeared, and the spleen decreased in size. Nine days after admission the patient's temperature again rose and he began complaining of severe pain in his right knee. This pain was associated with swelling and exquisite tenderness, and was not relieved by salicylates. As a result of the sensitivity tests combined treatment with chloromycetin and erythromycin was instituted. Supportive treatment consisted of vitamins, blood and plasma transfusions, and fluids given intravenously. This treatment was continued for four weeks with little improvement, at which time cortisone was added to the therapy. Following this the patient manifested signs of mental confusion and his course was progressively downhill. He died 50 days after his admission.

Autopsy Findings. The liver showed areas of focal and central necrosis. The kidneys were atrophic and revealed evidence of hyalinization of the tubules, tubular necrosis, and tubular nephritis. The lungs showed considerable congestion and numerous microabscesses. The spleen was enlarged as a result of congestion, and there was necrosis of the malpighian bodies. The brain was not examined.

DISCUSSION

Melioidosis, which resembles glanders in its clinical picture, is caused by a similar organism, the *Malleomyces pseudomallei.* This gram-negative bacillus, also referred to as *Pfeifferella Whitmori,* is a small pleomorphic rod-shaped bacillus that can be isolated from skin lesions, from the blood stream, and from the urine. The best method of isolating the organism is by inoculation of adult male guinea pigs, intraperitoneally or by scarification of the abdominal wall, with an aqueous suspension or culture of the infective material. The organism is obtained from the layers of the tunica vaginalis after 10 to 14 days. The reaction which occurs in the testis is known as the Straus reaction.[7,8]

There is an acute and a chronic form of the disease. The acute or subacute septicemic form, represented by our case, comprises

the great majority of cases and usually terminates fatally. The chronic form, of which only eight cases have been reported in the literature, have been indigenous in the Western Hemisphere.[2]

The acute form has a sudden onset, with an incubation period varying from a few hours to three weeks. The symptoms are variable, depending on the site of localization of the infection. There may or may not be a local inflammatory reaction at the site of inoculation that is accompanied by general malaise, headache, chills, fever of an irregular type, anorexia, vomiting, diarrhea, and joint pains. Usually the local site of infection shows an early tendency to suppurate and ulcerate, and as a rule the regional lymphatics and lymph nodes are involved early. From this site the infection often spreads to involve the nasal sinuses, the ears, conjunctivas, and the mucous membranes of the mouth, pharynx, larynx, trachea, and lungs. The septicemic form is characterized by widespread visceral involvement, and prostration and death in a few days or up to three weeks is the rule. The patient usually pursues a rapid downhill course, and recovery from the acute form is rare. In the chronic form the course is milder; the respiratory system is involved next in frequency to the cutaneous system, and the gastrointestinal tract is rarely involved. Liver lesions have been demonstrated in 10 per cent of the cases.[2,8]

The mode of transmission of the disease is not known; however, in the Far East it is believed that it is a disease of rodents and probably spread by contamination of foods with excreta of rats.[9]

As in glanders, the manifestation of the disease is varied, and the diagnosis may be difficult unless it is considered in the differential diagnosis. It is difficult to differentiate from typhoid fever, as was true in our case, or from staphylococcic septicemia, erysipelas, tuberculosis, syphilis, or rheumatic fever. In the absence of skin lesions the disease may be overlooked.[2,8]

There is no specific treatment for the disease. The various sulfonamides,[10] penicillin,[10,11] streptomycin sulfate, the broad-spectrum antibiotics, and autogenous vaccines have been used without success. Surgical treatment, with early incision, drainage of the abscesses, and wide excision and cauterization of the area is the most effective method of treatment of ulcers and suspicious nodules.

SUMMARY

Acute melioidosis is a glanders-like disease that is endemic in the Far East and may resemble typhoid fever at the onset. Transmission of the disease is probably by ingestion of food that has been contaminated by the excreta of rats. The diagnosis can be established by intraperitoneal inoculation of adult male

guinea pigs with material from the lesions, or with the patient's blood or urine, and demonstrating *Malleomyces pseudomallei*. Prevention of the disease by measures concerned with strict adherence to the basic principles of military sanitation with particular emphasis on rodent control is of prime importance. The treatment of the acute form with the sulfonamides, the broad-spectrum antibiotics, and cortisone does not alter the course of the disease.

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Carpe Bossu Disease

CHARLES W. METZ, *Lieutenant Colonel, MC, USA*
ROBERT T. McIVOR, *Captain, MC, USAR*

FOUR patients were seen recently at this hospital with painful swellings on the backs of their hands. Roentgenograms showed that they had one condition in common—a carpal styloid bone. When the presence of this bone is associated with symptoms, the condition is called carpe bossu disease. Inasmuch as there have been few articles on the subject in the English literature, the authors believe it will be of interest to report these cases:

CASE REPORTS

Case 1. A 40-year-old woman was seen in the orthopedic clinic of this hospital, complaining of a painful swelling on the back of her right hand. She had struck the back of her hand on a bathtub 14 days before. There was no immediate reaction. Two days prior to being seen at the clinic she awoke with a swelling on her wrist that soon became painful. Examination revealed an acutely tender swelling on the dorsum of the wrist, centered over the base of the third metacarpal. There was no redness or heat. Pain was present on gripping and on extension of the wrist. A roentgenogram (fig. 1) disclosed a carpal styloid bone. With immobilization in a volar splint and moist heat, the symptoms subsided in two weeks.

Case 2. A 30-year-old man was seen in the orthopedic clinic for a painful swelling on the back of the left wrist. There was no history of injury or unusual strain. Examination disclosed a characteristically firm swelling at the base of the third metacarpal. A roentgenogram (fig. 2) revealed a carpal styloid bone. The wrist was immobilized, with relief of symptoms in three weeks.

Case 3. A 29-year-old woman was seen at the orthopedic clinic with bony tumors of the backs of both hands. She had been aware of the condition for several years. Four months before being seen, the left wrist had become painful for no apparent reason. Pain had persisted in varying degrees of intensity up to the time of her visit. Examination revealed bony tumors of the dorsum of the wrist bilaterally with pain present in the left wrist on pressure and active motion. Roentgenograms revealed a styloid bone bilaterally. The left wrist was immobilized in

From U. S. Army Hospital, Fort Ord, Calif.

a cast for one month with considerable relief of the symptoms and swelling.

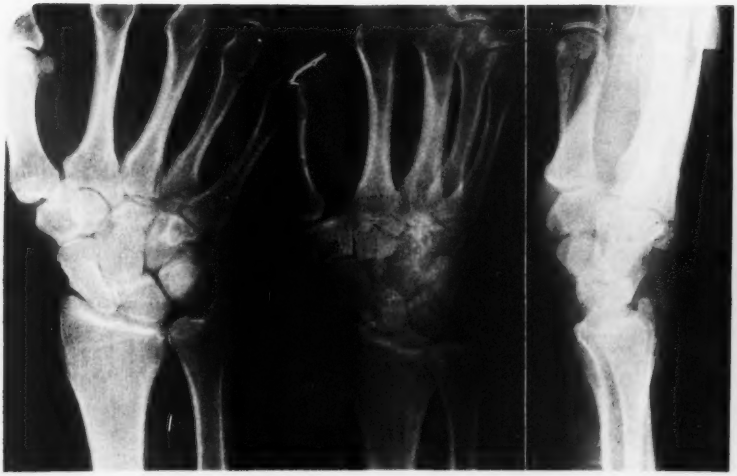

Figure 1 (case 1). Roentgenogram showing styloid bone with adjacent flecks of calcium.

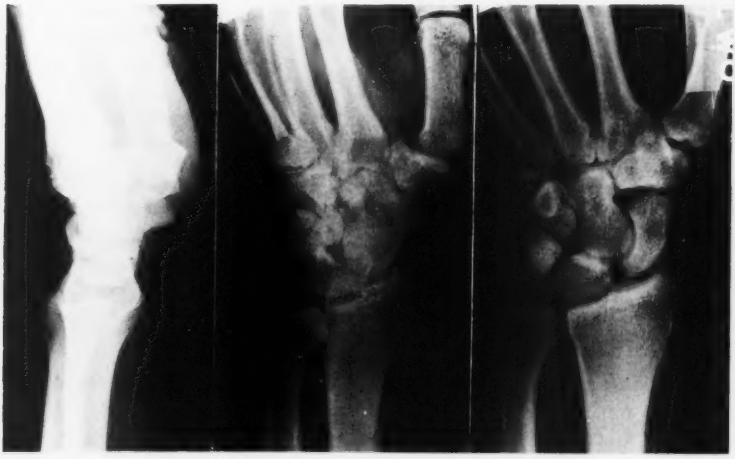

Figure 2 (case 2). The styloid bone is clearly shown in the lateral view. The bone is not distinctly seen in the anteroposterior views.

Case 4. A 37-year-old woman was seen for menopausal disorders in the medical clinic, at which time she mentioned that she had had pain and swelling in the right wrist on several occasions after doing heavy housework. At the time of her visit to the clinic the wrist was asymp-

tomatic. A roentgenogram (fig. 3) revealed a carpal styloid bone. No treatment was necessary.

Figure 3 (case 4). The styloid bone is shown at the base of the third metacarpal.

DISCUSSION

One question immediately comes to mind. Is this bone a true ossicle or merely a fragment of a previously fractured styloid process? Saltzmann,[1] as cited by Bassöe and Bassöe,[2] first described the styloid bone in 1725. He considered it to be a ninth carpal bone, occurring dorsally and immediately proximal to the base of the third metacarpal. It lay between the lesser multangular and the capitate bone. He believed that it developed from an isolated ossification center in the styloid process of the third metacarpal. In the patient operated upon by Bassöe and Bassöe the bone was found to be a distinct and separate ossicle, covered by cartilage on all sides save dorsally where the surface was rough for the attachment of a few fibers of the extensor carpi radialis brevis tendon. The body of the tendon passed over the styloid bone to its insertion at the base of the third metacarpal. These facts, coupled with the absence of substantial trauma in the majority of cases, lead them to believe that the styloid bone is indeed a separate ossicle.

There may be several mechanisms in the production of symptoms. Zimmer[3] believed that a bursa develops between the tendon of the extensor carpi radialis brevis and the ossicle. It becomes inflamed either by direct trauma or repeated strain put on the tendon. Bunnell[4] postulated a periostitis of the bone resulting

from direct trauma. Both of these explanations seem reasonable. In the cases in which strain precipitates the symptoms, the idea of a bursa being present is most logical.

The bone may be present without causing symptoms of any kind. Pfitzner[5] noted 16 styloid bones in 419 roentgenograms of the hand, and Bassöe and Bassöe noted 6 styloid bones in 450 roentgenograms. One of our patients (case 3) had the bone present bilaterally with symptoms in only one wrist.

The diagnosis of carpe bossu disease is made when the patient complains of pain and swelling of the dorsum of the hand, coupled with the appearance of the styloid bone by roentgenogram. The lateral view with the wrist in the flexed position discloses the bone most clearly. The anteroposterior view is of little help. Occasionally small deposits of calcium may be seen in the vicinity of the styloid bone. This may represent calcific degeneration of the extensor carpi radialis brevis tendon.

Three of the four patients seen at this hospital were treated with immobilization and heat to the wrist. The symptoms subsided in two to four weeks, after which there were no known exacerbations with light use of the hand. The fourth patient was asymptomatic at the time of her visit and required no treatment. Bassöe and Bassöe found it necessary to remove the bone surgically in one case, the patient getting complete relief. Their other two cases were treated conservatively.

SUMMARY

Four cases of carpe bossu disease are presented, with discussion of the anatomy and pathology of this condition. Conservative treatment produced relief of symptoms in all four cases.

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MEDICAL OFFICER CHOSEN PRESIDENT-ELECT OF AMERICAN COLLEGE OF PREVENTIVE MEDICINE

Colonel Louis C. Kossuth, Deputy Command Surgeon, Air Defense Command, has been named President-Elect of the American College of Preventive Medicine at the annual college meeting in Cleveland, Ohio. He will assume his duties as president in November 1958.

Colonel Kossuth

The college, which accepts only United States physicians, now has a membership of approximately 1,000 specialists in public health, aviation, and occupational medicine. The college was started for the purpose of advancing education, practice, and research in the field of preventive medicine, as well as to give aid to medical colleges in teaching preventive medicine. It also supports the development of local health departments.

Colonel Kossuth, a native of Wheeling, West Va., has been on active duty since July 1941. He has served as an instructor at the Medical Officers' Training School and at the Air Force School of Applied Tactics in Florida. In 1946 he was named Chief, Preventive Medicine Division, Headquarters U. S. Air Force, and then in 1951 Chief of the Preventive Medicine, USAFE. In 1954 he was appointed Head of the Department of Aviation Medicine and in 1956 was assigned Deputy Commandant of the School of Aviation Medicine, his last assignment before reporting to the Air Defense Command in 1957 as Deputy Command Surgeon.

Colonel Kossuth served as a United States Delegate to the First International Congress on Poliomyelitis and as a member of the U. S. delegation to the World Health Organization that revised the International Quarantine Regulations.

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FORMER SURGEON GENERAL DIES

Rear Admiral Perceval Sherer Rossiter, MC, USN (Retired-Inactive) died at his home in Santa Barbara, Calif., on 20 December 1957. He was 83 years of age.

Admiral Rossiter

Born at Shepherdstown, West Va., he was graduated from the University of Maryland with a degree of Doctor of Medicine. At the outbreak of the Spanish American War in 1898, he enlisted in the U. S. Army and after duty in Cuba, served in the Philippine Islands during the insurrection, returning to the United States in 1902. He was appointed Acting Surgeon in the United States Navy on 20 January 1903, and after more than 30 years of service in the ships and shore stations of the Navy was appointed Surgeon General of the Navy and Chief of the Bureau of Medicine and Surgery, Navy Department, on 17 May 1933, with the rank of Rear Admiral. He was reappointed on 17 March 1937 and served until 1 December 1938, when he was transferred to the retired list, having reached the statutory retirement age.

Upon his retirement, Secretary of the Navy Claude A. Swanson congratulated him upon his 35 years of service in the Navy, part of which were served in the highest post in the Medical Corps. The letter, quoted in part, follows:

"... The Department regrets your retirement from active service and takes this occasion to extend to you its heartiest congratulation and appreciation for your long and distinguished service to our Nation. During the time which you have so faithfully and efficiently served, you have witnessed many advancements in the morale, strength and efficiency of the Navy; and you have the satisfaction of knowing that you have contributed to the accomplishment of these results...."

Admiral Rossiter was a Fellow of the American Medical Association, the American College of Surgeons, and the Association of Military Surgeons. He was President of the Association of Military Surgeons from October 1937 to October 1938.

A MESSAGE FROM THE A. M. A.

Fluoridation of public water supplies, free choice of physician, organization of the American Medical Association, and the Forand Bill providing hospital and surgical benefits for Social Security beneficiaries were a few of the many important subjects dealt with by the House of Delegates of the American Medical Association during its eleventh Clinical Session at Philadelphia in December 1957.

Dr. Cecil W. Clark, of Cameron, La., was named 1957 General Practitioner of the year after his selection by a special committee of the Board of Trustees for outstanding community service. Dr. Clark, a 33-year-old country doctor who was a medical hero during Hurricane Audrey last June, was present at the meeting to receive the gold medal which goes with the annual award.

Speaking at the opening session of the House of Delegates, Dr. David B. Allman, of Atlantic City, A. M. A. President, called for "more freedom, not less, in America and in the medical profession." Dr. Allman urged the delegates to embark on local action campaigns to enlist full community support in opposition to the Forand Bill, H. R. 9467, a pending legislative proposal which, if enacted, would provide hospital and surgical benefits for persons who are receiving or are eligible for Social Security retirement and survivorship payments. The Forand Bill, he said, is "cut from the same cloth" as national compulsory health insurance and "emanates from the same minds."

The House condemned the Forand Bill as undesirable legislation and expressed satisfaction that the A. M. A. Board of Trustees appointed a special task force which is taking action to defeat the bill.

In settling the most controversial issue at the Philadelphia meeting, the House of Delegates approved a joint report of the Council on Drugs and the Council on Foods and Nutrition that endorsed the fluoridation of public water supplies as a safe and practical method of reducing the incidence of dental caries during childhood. The 27-page report on the study, which was directed by the House at the Seattle Clinical Meeting one year ago, contained these conclusions:

1. Fluoridation of public water supplies so as to provide the approximate equivalent of 1 ppm of fluorine in drinking water has been established as a method for reducing dental caries in children up to 10 years of age. In localities with warm climates, or where for other reasons the ingestion of water or other sources of considerable fluorine content

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From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor*

is high, a lower concentration of fluoride is advisable. On the basis of the available evidence, it appears that this method decreases the incidence of caries during childhood. The evidence from Colorado Springs indicates as well a reduction in the rate of dental caries up to at least 44 years of age.

2. No evidence has been found since the 1951 statement by the Councils to prove that continuous ingestion of water containing the equivalent of approximately 1 ppm of fluorine for long periods by large segments of the population is harmful to the general health. Mottling of the tooth enamel (dental fluorosis) associated with this level of fluoridation is minimal. The importance of this mottling is outweighed by the caries-inhibiting effect of the fluoride.

3. Fluoridation of public water supplies should be regarded as a prophylactic measure for reducing tooth decay at the community level and is applicable where the water supply contains less than the equivalent of 1 ppm of fluorine.

Acting on the issue of free choice in relation to contract practice, the House passed a resolution which reaffirmed approval of previous interpretations of the Principles of Medical Ethics by the Association's Judicial Council and directed that they be called to the attention of all constituent associations and component societies. One Council opinion, issued in 1927 and reaffirmed in Philadelphia, stated that the contract practice of medicine would be determined to be unethical if "a reasonable degree of free choice of physician is denied those cared for in a community where other competent physicians are readily available." The resolution also cited a Council opinion, published in the 19 October 1957 issue of *The Journal of the American Medical Association,* which stated that the basic ethical concepts in both the 1955 and 1957 editions of the Principles of Medical Ethics are identical in spite of changes in format and wording. This opinion added that "no opinion or report of the Council interpreting these basic principles which were in effect at the time of the revision has been rescinded by the adoption of the 1957 principles."

The 1927 Council report also pointed out that "there are many conditions under which contract practice is not only legitimate and ethical, but in fact the only way in which competent medical service can be provided." Judgment of whether or not a contract is ethical, the report said, must be based on the form and terms of the contract as well as the circumstances under which it is made.

Acting on the report of the Committee to Study the Heller Report on Organization of the American Medical Association, the House reached the following decisions on ten specific recommendations:

1. The office of Vice-President will be continued as an elective office.

2. The offices of Secretary and Treasurer will be combined into one office to be known as Secretary-Treasurer, and that officer will be selected by the Board of Trustees from one of its number.

3. The duties of the Secretary-Treasurer will be separated from those of the Executive Vice-President.

4. The office of General Manager will be discontinued, and the new office of Executive Vice-President will be established. The latter, appointed by the Board of Trustees, will be the chief staff executive of the Association.

5. The Council on Medical Education and Hospitals and the Council on Medical Service will continue as standing committees of the House of Delegates, but their administrative direction will be vested in the Executive Vice-President.

6. The voting members of the Board of Trustees will be limited to eleven—the nine elected Trustees, the President, and the President-Elect. The Vice-President and the Speaker and Vice-Speaker of the House of Delegates will attend all Board meetings, including executive sessions, with the right of discussion but without the right to vote.

7. The House disapproved of the proposal to elect the Trustees from each of nine physician-population regions.

8. The office of Assistant Secretary will be discontinued, and a new office of Assistant Executive Vice-President will be established.

9. The Committee on Federal Medical Services will be retained as a committee of the Council on Medical Service and will not become a part of the Council on National Defense.

10. The Speaker of the House will appoint a Joint and continuing committee of six members, three from the Board of Trustees and three from the House, to redefine the central concept of A. M. A. objectives and basic programs, consider the placing of greater emphasis on scientific activities, take the lead in creating more cohesion among national medical societies, and study socio-economic problems.

The accepted recommendations were referred to the Council on Constitution and Bylaws with a request to draft appropriate amendments for consideration by the House at the 1958 annual meeting in San Francisco.

COL. STAPP GIVEN PUBLIC SERVICE AWARD

Colonel John P. Stapp, USAF (MC), recently received the Mutual of Omaha Public Service Award presented at the twenty-fifth annual meeting of the Omaha-Midwest Clinical Society, for his outstanding research achievements in the field of human tolerance to mechanical force, and the development of protective devices and technics for withstanding crash-type decelerations. The award consists of a plaque and an honorarium.

Shown above, left to right, are Dr. Joseph D. McCarthy, Colonel John P. Stapp, USAF, Mr. V. J. Skutt, and Dr. Charles F. Moon.

The presentation of the award was made by Doctor Charles F. Moon, president of the society, in a ceremony in Omaha which included Doctor Joseph D. McCarthy, founder of the society, and Mr. V. J. Skutt, president of Mutual of Omaha. Colonel Stapp, who is chief of the Aero Medical Field Laboratory, Holloman Air Force Base, New Mexico, is the third recipient of the award. Previous winners were William Randolph Hearst, Jr., and Major Samuel Tyson, USAF.

OFFICERS HOSTS TO MEDICAL SOCIETY

Medical officers of Fort Bragg, N. C., and Pope Air Force Base, N. C., were hosts recently at a dinner meeting of the Cumberland County Medical Society, when Doctor Clarence E. Gardner, Jr., (right), Professor of Surgery at Duke University, was the principal speaker. Also shown, left to right, are Colonel Paul C. Sheldon, USAF (MC), base surgeon, Pope Air Force Base, Doctor John A. McKay, chief neuropsychiatrist, Veterans Administration hospital, Fayetteville, N. C.; Doctor Richard S. Kelly, Jr., president of the medical society; and Colonel Joseph N. Weaver, MC, USA, commanding officer of the hospital at Fort Bragg. The meeting was held at the Fort Bragg Officers' Open Mess.

FLYING ACCIDENTS IN THE AIR FORCE

Fourteen per cent of all the Air Force's flying accidents from 1953-1956 were listed as "cause undetermined." These accidents resulted in the death of 1,179 persons, or 36 per cent of the total number killed during those years. This thought-provoking statement was made by Colonel Harry G. Moseley of the U. S. Air Force Directorate of Flight Safety Research at a symposium on Toxic Hazards in Aviation at Air Materiel Command headquarters, held 6 and 7, November 1957 at Wright-Patterson Air Force Base, Ohio.

Those present included representatives of all the armed services, the Royal Canadian Air Force, and several civilian universities and industrial concerns.

"Most of those accidents," Colonel Moseley stated, "were caused by human failure. The extent of toxicants is yet to be determined, but they do have stature." He pointed out to the 160 aero-medical specialists in attendance that the pilot, in his environment, is subject to a great many substances that can be hostile to life. These constitute some of the toxic hazards in aviation.

OFFICERS CERTIFIED BY SPECIALTY BOARDS

Supplementary Listing

According to information from the Offices of the Surgeons General of the military medical services, the following regular Medical Corps officers have been certified by the boards indicated since the listings published in previous issues of this *Journal*.

American Board of Dermatology and Syphilology

Allen D. Smith, Col., USAF
John C. Wilkinson, Capt., USA

American Board of Obstetrics and Gynecology

Walter M. Wolke, Lt. Col., USA

American Board of Internal Medicine

Raymond W. Blohm, Lt. Col., USA

American Board of Pathology

Kenneth R. Dirks, Maj., USA

American Board of Ophthalmology

Lyle M. Shum, Maj., USAF

American Board of Otolaryngology

Albert C. Donohoo, Capt., USA
Donald J. Joseph, Lt. Col., USA
Carl M. Lineback, Lt. Col., USA
Robert P. Waldmann, Capt., USAF

American Board of Surgery

John A. Henderson, Lt. Col., USAF
Laurence M. Jackson, Jr., Lt. Col., USA
John M. Kroyer, Maj., USA
Jack B. McClure, Capt., USA

American Board of Anesthesiology

Richard A. Rink, Lt. Col., USA
Richard J. Ward, Maj., USAF

American Board of Plastic Surgery

Nicholas M. Azzato, Maj., USAF
Charles J. Thuss, Lt. Col., USA

American Board of Neurological Surgery

Gordon T. Wannamaker, Lt. Col., USA

American Board of Thoracic Surgery

(A Subsidiary Board of the American Board of Surgery)

William H. Moncrief, Jr., Lt. Col., USA
William C. Rountree, Maj., USAF

OFFICIAL DECORATIONS

The following awards have been announced by Departments of the Army and Air Force 1 December 1957:

Legion of Merit

Phillip G. Fleetwood, Col., USAF (MSC)
Maurice J. Fletcher, Col., MSC, USA
James W. Humphreys, Jr., Col., USAF (MC)
James G. Moore, Col., USAF (MC)
Bennie A. Moxness, Col., USAF (MC)

Soldiers Medal

Albin a Bagdonas, Capt., USAFR (MC)

Commendation Ribbon

James P. Albrite, Maj., MC, USA

DEATHS

DEAN, Jane Sloan, Captain, ANC, USAR, of Dallas, Tex.; stationed at Brooke Army Hospital, Fort Sam Houston, Tex., graduated in 1939 from Baylor University School of Nursing, Waco, Tex.; commissioned a Second Lieutenant in the Army of the United States 1 January 1944 and ordered to active duty 10 January 1944; ordered to inactive duty 16 February 1946; recalled to active duty 11 December 1950; ordered to inactive duty 14 September 1953; recalled to active duty 27 March 1956; died 9 November 1957, age 44, at Dallas, Tex.

MARTIN, Herbert Beardsley, Jr., Captain, DC, USAR, of Los Angeles, Calif.; stationed at the 665th Medical Detachment, 48th Surgical Hospital, Korea; graduated in 1956 from the University of Southern California School of Dentistry, Los Angeles, Calif.; commissioned a First Lieutenant in the United States Army Reserve 9 June 1956 and ordered to active duty 1 July 1956; died 12 November 1957, age 29, in Korea, of gunshot wounds of chest.

PLATER, Joseph Rue, Captain, DC, USNR, of Milwaukee, Wis.; stationed at the Headquarters, Twelfth Naval District, San Francisco, Calif.; graduated in 1928 from the School of Dentistry, Marquette University, Milwaukee, Wis.; appointed Lieutenant Commander in the United States Naval Reserve 9 October 1943; ordered to active duty 1 November 1943; released to inactive duty 6 February 1946; recalled to active duty 15 March 1948; died 26 October 1957, age 54, at Central Emergency Hospital, San Francisco, Calif., of coronary arteriosclerosis.

RHEN, Louis John, Captain, DC, USN, of Steelton, Pa.; stationed at the U. S. Naval Air Station, Atlantic City, N. J.; graduated in 1928 from the School of Dentistry, Temple University, Philadelphia, Pa.; appointed Lieutenant in the United States Naval Reserve 23 July 1942; ordered to active duty 31 August 1942; appointed Lieutenant Commander in the United States Navy 2 April 1947; died 12 December 1957, age 51, at the U. S. Naval Air Station, Atlantic City, of myocardial infarction.

THE "ACADEMIC YEAR"

With the start of the sixth session of the Military Medicine and Allied Sciences Course at Walter Reed Army Institute of Research on 2 September 1958, 10 to 15 clinicians who have completed their formal specialty training will be given the opportunity of a year of study and research in their respective fields, free of the demands of the clinic or ward. The mornings in this unusual course will be devoted to round-table seminars on basic scientific subjects related to medicine, such as various aspects of intermediary metabolism, systemic physiology, host-disease relationships, and genetics. The afternoons will be used for study and individually selected research projects in the student's particular specialty, with the help and supervision of a senior researcher in the field. Speakers at the morning sessions are to be outstanding figures in medicine from the armed services, the National Institutes of Health, and civilian universities and research institutions.

The small group with differing specialties, the informal atmosphere, and the length of the sessions (most sessions cover an entire morning) permit the discussion to develop topics completely and enable the students to become acquainted with the lecturers, as well as to listen to them.

The ultimate objective is to give officers with an interest in research and teaching the additional education necessary to make them highly effective in either field or as supervisors of research or teaching activities. Auxiliary subjects such as public speaking and medical writing also are included.

The course is open to regular officers of the three services, and applications should be processed through channels to the appropriate Surgeon General. Brochures describing the content and scope of the course in detail are available by writing to the Assistant Commandant, Walter Reed Army Institute of Research, Washington 12, D. C.

Reviews of Recent Books

CURRENT SURGICAL MANAGEMENT, A Book of Alternative Viewpoints on Controversial Surgical Problems. Editors: *John H. Mulholland,* M. D.; *Edwin H. Ellison,* M. D.; *Stanley R. Friesen,* M. D.; with contributions by 76 American authorities. 494 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $10.

The editors have condensed into one volume nearly all of the controversial surgical problems that perplex the general surgeon. It is outstanding in that each controversial point has been presented by an author who is an outstanding authority in a particular field. Each writes about his personal experience with and most present results obtained in their own practices. This volume, again, emphasizes the fact that a general surgeon must keep an open mind about the rationale of treatment of all diseases in which the standard method of treatment does not result in a very high percentage of cures. The only feature that is disturbing to the average general surgeon is that there are still so many diseases in which the results of surgical therapy by any of the methods presented leave a certain number of failures.

This textbook will be an excellent reference both in most small hospitals and dispensaries and should be revised at appropriate intervals to keep the surgical profession abreast of the new and changing treatment. The authors are to be congratulated in their ability to present the many facets of surgical management and to have received the co-operation of the numerous authors in this undertaking.

—*S. EDE, Capt., MC, USN*

CLINICAL GASTROENTEROLOGY, by *Eddy D. Palmer,* M. D., F. A. C. P.; illustrations by *Phyllis Anderson.* 630 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York, N. Y., 1957. Price $18.50.

This excellent book was originally intended for the gastroenterologist, but it is the opinion of the reviewer that it would be of great value to anyone interested in diseases of the gastrointestinal tract, including the internist and the general practitioner. Differential diagnosis is not covered. Eponyms are used very freely throughout the book. All parts of the gastrointestinal tract are covered thoroughly. The chapter on gastrointestinal manifestations of far removed diseases points out how diseases having no specific place in the field of the gastroenterologist may first present themselves to him.

The author stresses emotional factors in gastrointestinal disorders, both primary functional disease and those diseases which carry with them an emotional aspect. In most of the sections on treatment of various diseases with emotional factors, he notes that interviews with the gastroenterologist are sufficient and the aid of a psychiatrist is not necessary. In the section on ulcerative colitis where the conflicts may be deeper seated, psychiatric aid is recommended. It is stated that

statistics on the cure of gastric carcinoma are misleading because of the failure to distinguish between the terms operability, resectability, palliation, survival, and cure. The author writes: "It seems clear that we should give up current measures directed as cure as a bad job now without waiting for a more effective replacement. A degree of emotional and physical comfort is all that can be promised the patient at the moment." Perhaps the author had in mind, when he recommended such a complete change of philosophy, that perhaps there should be a middle-of-the-road attitude which would be more effective from a physical standpoint.

This is the most thorough book on gastroenterology that the reviewer has ever had the pleasure to read. To obtain the maximum benefits from this book, it is necessary that the reader have some previous knowledge of gastrointestinal diseases. A bibliography appears at the end of each chapter and is very brief. The illustrations and charts are excellent. —*EDWARD P. MC LARNEY, Capt., MC, USN*

THE PHYSIOLOGY OF INDUCED HYPOTHERMIA, Proceedings of a Symposium, 28-29 October 1955, convened by The Division of Medical Sciences, National Academy of Sciences, National Research Council, with the Sponsorship of The United States Army, Navy, and Air Force. *Robert D. Dripps*, M. D., Chairman and Editor. Publication 451. 447 pages; illustrated. National Academy of Sciences, National Research Council, Washington, D. C., 1956. Price $3.50.

This book might be considered the primer for hypothermia, the best review of available material as of 1955. The discussions after each major section make it an excellent text for teaching. The review chapter for each of the five parts and the discussions serve to answer many questions raised in the individual articles and to point out deficiencies in our present knowledge. A good symposium is never the result of good writing but rather intelligent editing, as has been done here.

The five parts follow logically, one from the other. Part one compares induced hypothermia with true hibernation on a physicochemical and physiologic basis from the cellular level to that of the intact total organism. Part two considers the effect of induced hypothermia on all the major organ systems in the body. Myocardial irritability, the major problem in the clinical application of induced hypothermia, is covered in part three. The clinical application of induced hypothermia in part four is the weakest point in the book. It is neither a general summary of possible or indicated applications nor is it a series of specific applications but a little of each. The final part covers the technics of inducing hypothermia and problems related to each technic. It includes the use of drugs as related to technics such as the "lytic cocktail."

The reader must remember that neither this book nor the individual articles were written as a text for "do-it-yourself" hypothermia, but rather to help define the condition of, the methods of, and the problems of induced hypothermia. And this has been very well done. It is an excellent book for all interested in this field.

—*HENRY D. GREEN, Capt., MC, USA*

CLINICAL ORTHOPAEDICS, Editor-in-Chief, *Anthony F. DePalma.* Number 9. The Pathologic Physiology of Metabolic Bone Disorders, with special section on Motorist Injuries and Motorist Safety-Primary Motorist Safety: Prevention of Accidents, under guest editorship of *Jacob Kulowski,* M. D. 353 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $7.50.

Ninth in a series this volume presents the third and last part of a serialized symposium on "Motorist Injuries and Motorist Safety." Previously volume 7 contained discussions of the "Clinical Aspects" and volume 8, "Reduction of Injuries (Crash-Impact Engineering)." The latest is entitled "Primary Motorist Safety: Prevention of Accidents," and is of particular interest because of the direct contributions that can be made by the medical profession at large in the continuing study of predisposing factors, mechanisms and preventive measures in motorist injuries.

The eight papers of the first section, "The Pathologic Physiology of Metabolic Bone Disorders," comprise an excellent summary of the known information of the normal physiologic mechanisms, and the aberrations therefrom, of the effects of hormones, vitamins, steroids, and mineral metabolism on the skeleton. Designed to present a group of unrelated papers under the heading "General Orthopaedics," the second section contains 11 papers on a variety of subjects. These are not written to summarize current information on a given subject, and thus provide a reference source for review, but are the type of article usually appearing in medical journals. One by Scaglietti and Stringa of Italy, lends an international air of professional contribution which would seem worthy of encouragement for future volumes.

—*JOHN D. BLAIR, Col., MC, USA*

ATLAS OF EYE SURGERY, by *R. Townley Paton,* M. D., F. A. C. S.; *Herbert M. Katzin,* M. D., F. A. C. S.; and *Daisy Stilwell,* Illustrator. 248 pages; illustrated. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1957. Price $15.

This book by two excellent eye surgeons and a capable medical illustrator is intended primarily as a surgical manual for residents in ophthalmology. It consists mainly of drawings designed to show each operation, step by step. The brief text is intended only to summarize information which cannot be illustrated. The visual approach is maintained on every page by 464 line drawings, unmatched for accuracy and fine detail. All pictures have been drawn from the surgeon's position above and behind the patient's head—the position he must take during the operation.

The text is the outgrowth of the authors' long-held belief that a full set of illustrations is exceptionally helpful in teaching the fine details of surgical procedures. The excellent detailed presentation of the subject of corneal transplantation in this manual reflects the interest of the authors rather than the frequency of the operation. An interesting and helpful feature is an Index of Instruments and Notes on Instruments.

A typographical error was noted under figure 438 dealing with controlled tenotomy of the superior oblique muscle. The legend states that the sheath of the superior rectus muscle is longitudinally incised whereas this should have been superior oblique. It is the feeling of this reviewer that the technic of tucking the tendon of the superior oblique medially to the superior rectus muscle might result in the tuck being too close to the pulley of the superior oblique, thus limiting the gaze of the eye downward and inward. By tucking the tendon temporally to the superior rectus muscle, this complication cannot occur. In the discussion of the technic of evisceration, the size of the implant was not mentioned. It seems important to the reviewer that the implant be smaller than that used in enucleation so that the eviscerated eyeball will not be too large for a prosthesis.

The authors are to be congratulated for presenting a remarkable new book illustrating the technic of eye surgery. The visual approach is a new and most effective means of teaching the subject of eye surgery. It is recommended for every resident in ophthalmology, and it will be helpful to the experienced ophthalmic surgeon, especially to those who teach surgery.—*KARL J. PALMBERG, Capt., MC, USN*

HUMAN BLOOD COAGULATION and Its Disorders, by *Rosemary Biggs*, B. Sc. (Lond.), Ph. D. (Toronto), M. D. (Lond.), and *R. G. MacFarlane*, M. A. (Oxon.), M. D. (Lond.), F. R. S. 2d edition. 476 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $8.50.

There has been great progress in research on blood coagulation in recent years and the topic is well covered and correlated in this volume on blood coagulation. In this field, knowledge and theories are constantly changing, making it difficult to write a coherent and interesting text. However, the authors have achieved a valuable and readable account of the subject. The volume covers in an extensive manner all phases of blood coagulation. It is highly recommended to all who are interested in blood coagulation either as a reference or as a laboratory manual.—*V. E. MARTENS, Capt., MC, USN*

MEDICAL NURSING, by *Amy Frances Brown*, R. N., B. Ed., M. S. in N., Ph. D. 3d edition. 947 pages; 447 illustrations, 42 in color on 32 figures. W. B. Saunders Co., Philadelphia, Pa., 1957.

The author has written a compendium of medical illnesses and the nursing care involved in the care of medical patients. Much research and organization have gone into the preparation of this text. Its presentation is simple, direct, factual, and richly illustrated. There are liberal quotations from and references to medical texts, medical and nursing journals, and periodicals of allied fields.

Students accustomed to educational methods involving library research, creative thinking, and the application of scientific principles and problem solving may find this textbook too didactic and factual, even though directed to them. The older graduate nurse might find this book of interest and value as a general review text in medical nursing.

As a medical nursing text, its value would be enhanced if there were more emphasis on the nursing arts involved in meeting the problems encountered in the home as well as the hospital in the neoplastic diseases and the diseases of maturity and old age. Miss Brown has thoroughly covered the medical and nursing aspects of diseases of the nervous and locomotor systems, and communicable diseases both bacterial and nonbacterial in origin. There are individual chapters devoted to poliomyelitis and pulmonary tuberculosis.

By way of introduction to each chapter, worthwhile problems for the student to consider are presented. The bibliography and references are current and the appendix includes an excellent listing of agencies and their locations specifically related to rehabilitation, home-care programs in long-term illness, the aged, cancer, diabetes, and diseases of the nervous system. Students and instructors would find this a complete and ready medical reference.—*EVELYN M. BEDARD, Maj., USAF (NC)*

HUMAN BLOOD GROUPS AND INHERITANCE, by *Sylvia D. Lawler,* M. D., and *L. J. Lawler,* B. Sc., with a foreword by *R. R. Race,* Ph. D., M. R. C. S. (England), F. R. S. 103 pages; illustrated. Harvard University Press, Cambridge, Mass., 1957. Price $1.50.

Here is a clear, compact, and sound discussion of the human blood groups and their hereditary bases. The rich background of the authors, who are British researchers of international repute, is demonstrated in stimulating fashion. Following a historical survey, a lucid description is given of red cell antigen and antibody behavior upon which blood grouping technics are based, and suggestions are included for organization and methods in the laboratory. The chapters on the heredity of blood groups resolve many questions on the exact manner of inheritance of normal human characteristics. The material on genetics is readily understandable even to a reader with little or no background in this field. The ways in which iso-immunization to the Rh factor occurs, the role of sensitization in hemolytic transfusion reactions, and in the causation of hemolytic disease of the newborn are very well covered. Although a bibliography has not been included, the indexing and the glossary are more than adequate. This manual should be exceptionally useful, particularly in the training of new personnel in the organization of a blood grouping laboratory.

—*JOSEPH V. MICHALSKI, Maj., USAF (MSC)*

FLUID AND ELECTROLYTES IN PRACTICE, by *Harry Statland,* M. D. 2d edition. 229 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $6.

The second edition of this volume has been designed as a teaching primer, not as a source book. This purpose has been accomplished at the risk of oversimplification and avoidance of controversial matters. An example of the latter is a concise description of the author's procedure for intestinal lavage as an adjunct in the management of renal shutdown, without reference to continuous gastric suction preferred by

certain other authorities in this field. Similarly, no mention is made to Scribner's recently published concept (1956) of the relationship between changes in total body potassium and changes in the capacity for storage of potassium, and the more critical interpretation of the serum potassium related thereto. Even though revision of the section on metabolism and renal excretion of potassium constitutes a major change in this second edition, the author does not clearly state that acidosis increases and alkalosis decreases the serum potassium level independently of changes in the potassium content or capacity. Notwithstanding the foregoing, as a practical guide, this small volume continues to meet the widespread demand for a succinct account of the physiology and pathology of the body fluids.

—*H. LEONARD JONES, Jr., Capt., MC, USN*

KAPOSI'S SARCOMA, Multiple Idiopathic Hemorrhagic Sarcoma, by *Samuel M. Bluefarb,* B. S., M. D., F. A. C. P. American Lecture Series, Publication No. 308, A Monograph in The Bannerstone Division of American Lectures in Dermatology, edited by *Arthur C. Curtis,* M. D. 171 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $5.50.

This monograph is the initial volume of a series of studies on the cutaneous manifestations of the diseases of the reticuloendothelial system. The pages of this small, well-printed, and diffusely illustrated volume contain a concentration of knowledge concerning Kaposi's sarcoma (multiple idiopathic hemorrhagic sarcoma) not to be found in any other work. From the historical aspects through the etiology, pathology, symptoms, diagnosis and differential diagnosis, prognosis and treatment one is impressed by the amount of work represented. The publications on this subject have been covered comprehensively (291 references) and condensed into an easily read work that contains the present knowledge of the subject in a readily available form. The chapters on diagnosis and differential diagnosis, prognosis, and treatment alone are worth the price of the book to any who are dealing with this rare and somewhat controversial disease. Most dermatologists will want to add this work to their libraries, and it should certainly be available on the shelves of all reference libraries.

—*JOHN D. WALTERS, Capt., MC, USN*

THE PHYSIOLOGY AND BIOCHEMISTRY OF LACTATION, by *S. J. Folley,* D. Sc., Ph. D., F. R. S. 153 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1956. Price $3.75.

This is a series of lectures given by the author in 1953 dealing with the physiology and biochemistry of lactation. The majority of the subject matter pertains to advances in the dairying industry. There is a wealth of information on the application of fundamental knowledge of hormonal control of the mammary gland to artificial stimulation of udder growth and lactation in cattle. Inasmuch as the dairy industry provided the main stimulus for the author's investigations it is not surprising that a significant portion of the volume is concerned with

factors that will increase the quality and quantity of milk. Of clinical application are the sections dealing with the development of milk secretion (lactogenesis) and maintenance of milk secretion (galactopoiesis). The pertinent literature dealing with the effects of adrenal, thyroid, and pituitary function on these processes is thoroughly reviewed. The important role of growth hormone in galactopoiesis is covered in detail, most of the work in this area having emanated from the author's own laboratory. The discussion in these areas is authoritative and comprehensive and based on extensive personal experience as well as thorough familiarity with the literature. The two final chapters are devoted to the biochemistry of milk fats and protein and the origin of lactose. This volume will undoubtedly remain for many years as the definitive text on this subject. While its appeal is not primarily to the practicing physician, those concerned with gynecologic endocrinology will find it a valuable addition to their libraries.

—*PAUL J. ROSCH, Capt., MC, USA*

DEGENERATIVE CHANGES IN THE STERNOCLAVICULAR AND ACROMIOCLAVICULAR JOINTS IN VARIOUS DECADES, by *Anthony F. DePalma,* M. D. American Lecture Series, Publication No. 309, A Monograph in The Bannerstone Division of American Lectures in Orthopaedic Surgery, edited by *Charles Weer Goff,* M. D. 178 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $5.50.

This unique and scholarly monograph is an important contribution to medical literature. The author has described pathologic and normal anatomy of the acromioclavicular and sternoclavicular joints in great detail in the various decades of life. The book has many fine photographic reproductions of dissected specimens and of microscopic appearances of specimens of various ages. The functions of these joints are described to give a better understanding of clinical abnormalities.

This work will be of assistance to clinicians who treat disorders of these areas. In the past, these joints have not been well understood but with this excellent presentation orthopedic surgeons will have better understanding of the pathology of these areas. The bibliography is complete. The book is highly recommended to those in the field of orthopedic surgery and would be a valuable addition to a library of anyone interested in this subject.

—*ALFRED O. HELDOBLER, Lt. Col., MC, USA*

THE YEAR BOOK OF ENDOCRINOLOGY, (1956-1957 Year Book Series), edited by *Gilbert S. Gordan,* M. D., Ph. D., F. A. C. P. 377 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $6.75.

Today's well rounded endocrinologist must be a clinician first, but must also be well versed in pharmacology, protein and steroid chemistry, intermediate carbohydrate, protein, and fat metabolism, as well as radioisotope and laboratory technics. Fortunately, Dr. Gilbert Gordan possesses all these capabilities, and the best evidence is this year-

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book which, like its predecessors, continues to be one of the most valuable reference guides to current endocrine thought. The present volume abstracts about 400 articles dealing with a variety of endocrine subjects that appeared during the calendar year 1956. While the majority of articles come from American and British journals, a number are gleaned from specialty journals not usually read by the endocrinologist or internist, and others are obtained from foreign publications. The abstracts are objective, concise, and accompanied by the original illustrative material when indicated. Valuable critical editorial comments occur after selected articles which often help to explain the significance of the results, or to place the findings in proper perspective, in view of prior or subsequent studies.

The book is divided into chapters dealing with specific endocrine glands and each chapter begins with a preface surveying recent developments in that particular field. There also are two special articles, "Thyroid Hormone Transport" by Albright and Larson, and "Glucagon: Recent Developments" by Elrick, which further explain new trends in these areas and are in keeping with the high caliber of the volume in general. There are certain articles which might have been excluded and others which might have been included, but this is a personal matter and Dr. Gordan's judgment results in a very fair cross section of the important material. This volume is the best answer to the problem of maintaining contact with an ever-increasing literature. It may be that future years will see separate Yearbooks of "Clinical Endocrinology" and "Endocrine Research" just as the Endocrine Society has found it necessary to publish two separate journals. Till then, the present volume serves both functions admirably, and remains indispensable to the endocrinologist or internist with interest in metabolic disorders, as well as a tribute to the unique talents of its extraordinarily capable editor. —*PAUL J. ROSCH, Capt., MC, USA*

THE DIAGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS, by *Paul Dufault,* M. D., with chapters on Pathology by *A. Reynolds Crane,* M. D., and Pulmonary Function by *Oscar Feinsilver,* M. D. 2d edition. 426 pages; 162 illustrations and 1 plate in color. Lea & Febiger, Philadelphia, Pa., 1957. Price $9.

This book covers the problem of tuberculosis in a concise, accurate, and practical manner. As a second edition it provides an up-to-date reference on current treatment and diagnosis. No attempt is made to provide a solution to the many controversial concepts in drug therapy. In regard to this the author states: "These problems are under study and solutions are being worked out. In the meantime, it is well to be aware that chemotherapy for tuberculosis is constantly changing and progressing."

Despite the fact that the "popular" attitude towards tuberculosis may be limited to a concern of current chemotherapeutic and surgical regimens, the authors present a scientific document on all aspects of pulmonary tuberculosis. They have assembled under one cover labora-

tory methods in diagnosis, physiologic tests for pulmonary insufficiency, radiologic patterns of disease, tissue pathologic characteristics, and tests of organism susceptibility and resistance to drugs. In covering this material many fine illustrations have been used. The colored plates illustrating the segmental anatomy of the lungs are exceptionally good. The chapter on allergy and immunity is well presented. These basic concepts are made meaningful by concise writing. The chapter dealing with mental and emotional aspects of patient management is excellent. It is brief but intensely practical and offers technics in patient management directly related to the reality of the doctor's day's work.

—JAMES C. SYNER, Capt., MC, USA

SURGEONS ALL, by *Harvey Graham*, M. D. Foreword by *Oliver St. John Gogarty*. 459 pages; illustrated. Philosophical Library, New York, N. Y., 1957. Price $10.

This volume presents a kaleidoscopic picture of the parade of surgeons through the world's known history. In capsular form, the author presents the contributions of the ages to the surgical art, with considerable emphasis on our English, Scottish, and French medical and surgical forebears.

The reader is duly impressed with the considerable experience which the earlier surgeons obtained on the field of battle and the great obstacles which confronted them. The difficulties in the treatment of fractures, wounds, and burns in interestingly woven into the progress of the art of surgery. Some of the clandestine activities of the "resurrectionists" are presented in a witty fashion. This colorful group, present in England for 300 years, became defunct with the passage of the Anatomy Act of 1832.

The reader is held in awe on the professional and extracurricular activities of such men as William Harvey and John Hunter and their tremendous capacity for work almost unheard of in this age. Both dissected many hundreds of different species of vertebrates in order to learn anatomy and physiology. One is forced to reflect and compare these activities with our contemporary courses in comparative anatomy.

Today in aviation medicine we ponder the problems of the sound and thermal barriers while, prior to 1840, surgeons both in America and Europe were trying desperately to pierce the twin barriers of pain and sepsis which practically limited them to amputations and ligations. The author, with justification, dwells considerably upon Lister and his contemporaries, and impresses the reader of the new vistas in surgery which were opened by his antiseptic technics and Crawford Long's discovery of ether. American readers perhaps would have liked to have seen more written on the contributions of such poineers as Halstead, Kelley, Cushing, and Graham.

There is an outstanding bibliography which can be readily used for a more precise study of a given individual or era. "Surgeons All" is well recommended for leisure reading.—*PAUL V. DAVIS, Col., USAF (MC)*

DENTAL CLINICS OF NORTH AMERICA, Symposium on Emergencies in Dental Practice, July 1957, *James R. Cameron,* D. D. S., Guest Editor, and *26 contributors.* 617 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $14 per year (sold only on a yearly basis of 3 numbers—March, July, and November).

This is a compilation of 22 articles submitted by different authors, specifically for this publication, devoted to the management and prevention of emergencies in the practice of general dentistry and oral surgery. All of the contributors are sufficiently well known to lend scientific merit to the volume, and each article is concise so that reading is easy.

If only one outstanding point were to be retained from this reading, it would concern the priority given to oxygen therapy in the management of untoward reactions in the dental office to drugs, anesthetics, and syncope. There appears to be general agreement that every dental operating room should have ready access to oxygen apparatus and therapy.

The general theme of the text is worthily repeated by several of the contributors; the best way to treat emergencies is to prevent them. Hemorrhagic problems are adequately surveyed from the standpoint of prevention and treatment. Some of the complications presented by systemically ill patients to dental treatment are analyzed with the thought of prevention, but emergency treatment procedures are given. Various accidents related to dental operative procedures are viewed through the eyes of those experts required to provide corrective measures.

The management of problems in oral trauma are well presented. Seldin's article on the "Management of Pregnant Patients in Dental Practice" is authoritative, current, and particularly well done. The articles on the medico-legal aspects of dentistry and the role of the dentist in treating mass casualties also require particular commendation. —*THEODORE A. LESNEY, Capt., DC, USN*

PLASTIC ARTERIAL GRAFTS, by *W. Sterling Edwards,* M. D. 126 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $4.50.

This 102-page monograph on plastic arterial grafts is a review of the history, development, technic and problems of artery blood vessel replacement by various methods. Brief reference is made to the diagnosis and treatment of acute arterial injury, the management of aneurysms, segmental obstructive arteriosclerosis, and the surgery of the thoracic aorta.

The monograph is well written and well illustrated. Numerous references are made to the writings of other investigators so that a very thorough bibliography may be found.

In essence, however, the principal theme of this monograph is the crimped nylon tube. This is understandable, since the author has played an important part in the development and in the clinical application of this prosthesis. The biggest objection by other investigators to the use

of nylon as a material for an arterial graft is the loss of tensile strength and deterioration of nylon after implantation. Dr. Edwards admits his own confirmation of these findings, but with what he considers to be important modifications. He reports one experiment where the nylon tape used to tie the graft in place shredded like wet tissue paper, yet the tensile strength tests of the graft itself showed no loss in tensile strength. He offers no explanation for this discrepancy in nylon degeneration but considers several variables dealing mainly with the size of the filaments in the material used, the chemical modification by formic acid, and also the use of silicone solution in treating the nylon tubes. At any rate, further investigation is needed before any definite conclusions can be arrived at.

Great strides have been made in the past five years in blood vessel replacement by homografts and synthetic materials, thanks to the efforts of such investigators as Dr. Edwards. The ultimate solution will surely be found, but this will take time.

The author's closing statement honestly summarizes the development of the crimped nylon tube as "only a step in the direction toward a final and ultimately ideal arterial graft." The statement only emphasizes further the feeling of the reviewer that the book has been prematurely published. This is unfortunate, since a potential value has been lost because of the lack of proof that only time can give.

—*FERDINAND V. BERLEY, Capt., MC, USN*

PROGRESS IN NEUROBIOLOGY: II. Ultrastructure and Cellular Chemistry of Neural Tissue, edited by *Heinrich Waelsch*, M. D., with 37 participants. Series Editors: *Saul R. Korey*, M. D., and *John I. Nurnberger*, M. D. 249 pages; illustrated. Paul B. Hoeber, Inc., Medical Book Dept. of Harper & Bros., New York, N. Y., 1957. Price $7.50.

This publication reports a symposium sponsored by the American Neurological Society and the Western Reserve University School of Medicine. Major emphasis is on chemical constituents of neural tissue in terms of their intimate cellular distribution as well as changes observed under physiologic and pathologic conditions. There is a discussion of ultrastructure as observed in the electron microscope and to impulse events related to synaptic activity and active secretory functions. The subject material is presented in lecture form, followed by a list of essential current references and by a discussion of panel members. Each subject is covered by direct contributions from research investigators in the field. Methods of other investigations are revealed in the various discussions, and tables extending investigative data are inserted in various areas throughout the text. There are 12 chapters in this volume covering the cellular chemical aspects of neural tissue. This publication would be of particular interest to biochemists and physiologists who are concerned with laboratory investigations involving neural tissue, but is of less value than the original published reports. —*WILLIAM H. LEE, Lt. Col., USAF (MSC)*

HISTOLOGY, by *Arthur Worth Ham,* M. B., F. R. S. C. 3d edition. 895 pages; 582 figure numbers, including 8 plates in color. J. B. Lippincott Co., Philadelphia, Pa., 1957. Price $11.

This standard textbook histology is written by a noted educator primarily for the use of students. The popularity of the book is well attested to by the need of a third edition within five years of its first publication. The latest edition differs from the second edition of 1953 by some augmentation and deletions in the text in order to incorporate results of recent research, by the inclusion of a number of beautiful and instructive electron micrographs, and by having an up-to-date bibliography appended to each chapter. The value of the book for a medical officer rests on the comprehensive treatment of the subject matter and the excellent bibliography. —*HELMUTH SPRINZ, Lt. Col., MC, USA*

OCCIPITOPOSTERIOR POSITIONS, by *Edward L. King,* A. B., M. D., F. A. C. S., F. A. C. O. G. American Lecture Series, Publication No. 310, A Monograph in American Lectures in Gynecology and Obstetrics, edited by *E. C. Hamblen,* B. S., M. D., F. A. C. S. 106 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $3.75.

This readable, well-illustrated small volume brings together practically all of the methods of handling occipitoposterior positions, as well as discussions of etiologic factors involved, differences in labors with these positions, and the results of treatment. The methods of management, both operative and nonoperative, are presented and illustrated in detail. The nonoperative methods described include positioning on the side to which the occiput points, use of the knee-chest position, and manual rotation as described by Danforth. Pomeroy's and Melhado's methods using manual rotation and forceps also are presented using the original illustrations.

The operative methods of Smellie discovered in his use of the forceps is quoted verbatum, as are Scanzoni's and Kielland's original descriptions of their operations. Seides' two-forceps maneuver and Bill's modification of the Scanzoni procedure are included as well as the authors methods and opinions. The use of Barton forceps as described by Barton, Caldwell, and Studdiford is summarized and is illustrated by some very nice redrawings from their original article. Other operations, described by DeLee and Greenhill, Merchán of Colombia and Maughan, are presented in sufficient detail for clarity. The forceps of Mann and of Jacobs, and their use, are included for those interested.

The author's attention given to (1) correct diagnosis, (2) proper evaluation of the pelvis, (3) consideration of cephalopelvic disproportion, (4) insistence on spontaneous labor with careful observation, (5) allowance of adequate time for spontaneous anterior rotation, (6) adequate maternal support, (7) conservatism with stimulation, (8) appropriately selected operative intervention and (9) thorough knowledge of operative technic made this a welcome addition to the obstetric literature. —*DWIGHT A. CALLAGAN, Capt., MC, USN*

HORMONAL REGULATION OF ENERGY METABOLISM, compiled and edited by *Laurance W. Kinsell,* M. D. 242 pages. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $5.25.

This book contains the proceedings of the 1956 Metabolic Conference and includes reports on carbohydrate metabolism, enzymatic control, pituitary hormones, the thyroid, insulin, and the adrenal cortex. It is of interest to read the expression of the foremost authorities in the field of metabolic research and to sense the challenge of problems to be resolved. The book is advertised to be of interest to "clinicians, clinical investigators, and fundamental scientists," but for the practicing clinician it may seem far afield from matters of practical value. There is little information which will aid in patient management but physicians interested in the fields of metabolism and endocrinology may be challenged by some facet of research.

—*FRANCIS G. SOULE, Jr., Capt., MC, USN*

THE YEAR BOOK OF DERMATOLOGY AND SYPHILOLOGY (1956-1957 Year Book Series), edited by *Rudolph L. Baer,* M. D., and *Victor H. Witten,* M. D. 464 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1957. Price $7.

This book, an annual publication, is a good review of the current dermatologic literature. It is a valuable source of information to keep one abreast of the times, and should be well accepted by the profession. The entire field of dermatology and syphilology is well covered. It is noted that syphilis is still with us, and a review of the advances made in this disease is very timely, especially when some people are likely to sit back and relax when an almost sure cure for a disease is discovered.

The first 107 pages are given over to a very prevalent condition, allergic eczematous contact dermatitis, and this subject is especially well treated, especially the therapy of this type of dermatosis. The chapter on drug eruptions is timely, and it is noted that some of the newer drugs are still not "wonder drugs," and that some of them might be more common sensitizers than we realize at present. The chapter on "Cancers; precanceroses; Other Tumors" serves as a reminder that one should be concerned with the layers of the skin as well as its outer surface. Another on fungus diseases is short, but gives the pertinent facts of diagosis and treatment of this prevalent dermatosis. More than 100 pages are devoted to investigative studies. In this portion of the book the various "subfields" of dermatology receive their just recognition. This section might well occupy a separate book.

The scientific merit of this publication can not be questioned. The authors have achieved their aims. The major shortcomings lie in the inclusion of too many individual case reports, and too many descriptive terms in an already confused nomenclature. The book is not recommended for anyone who has not had at least some formal training in the field.

—*JOHN H. COX, Capt., MC, USN*

PSYCHOPATHIC PERSONALITIES, by *Harold Palmer,* M. D. 179 pages. Philosophical Library, Inc., New York, N. Y., 1957. Price $4.75.

It is difficult to determine the audience for whom the book is intended. The author states it to be for the benefit of "workers in other disciplines including those concerned with management of human beings." As such, professional persons in the field may find little that is new to them, and adjunct disciplines or the relatively untrained may be somewhat confused by the author's strictly didactic approach unaccompanied as it is by illustrative case recordings.

In purviewing the gamut of mental disorder, the author stays close to the generally accepted descriptive criteria and treats all schools of thought with unusual fairness. His discussions of hysteria and psychopathic personality are particularly noteworthy and reflect his prefaced statement to the effect that "these are the two essays I have most enjoyed composing," parenthetically because he believes it is the "hysterics, paranoiacs and psychopaths who disrupt and bring nations to the brink of War." His concept in regard to the relationship of stress to schizophrenia needs some charification and, in fact, the entire essay on schizophrenia seems somewhat weak. Otherwise, the book is written with a vigor and enthusiasm which certainly makes for more interesting reading, and it is easy to imagine the writing follows closely the orginal oral presentation. —*JAMES M. BAILEY, Lt. Col., MC, USA*

The Salient Points and the Value of VENOUS ANGIOCARDIOGRAPHY in the Diagnosis of the CYANOTIC TYPES of CONGENITAL MALFORMATIONS of the HEART, A Ten-Year Study of 421 Angiocardiograms done on 283 Patients, by *Benjamin M. Gasul,* M. D.; *Gershon Hait,* M. D.; *Robert F. Dillon,* M. D.; *Egbert H. Fell,* M. D. 80 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $3.50.

This volume contains angiocardiographic findings in the ten most commonly encountered cyanotic congenital lesions of the heart. An arbitrary grouping under four categories is given, ranging from those which can be diagnosed by the angiocardiogram alone to those which always require additional information. No attempt is made to correlate other findings. Each of the ten defects is illustrated by a drawing, following which the angiocardiographic views are reproduced which best show the pertinent findings, usually two to four pictures. The latter have been beautifully reproduced. Accompanying the illustrations, there is a brief outline given under the headings of pathology, hemodynamics, and points to be noted in the angiocardiographic interpretation.

The presentation of the material is excellent so far as it goes, and is much superior to that covering this phase of the subject which is to be found in some of the other texts. However, one wonders if it would be better to give a more composite picture of all the findings present in a given congenital defect of the heart, since the patient is rarely studied solely by angiocardiography.

—*CLEMENT D. BURROUGHS, Capt., MC, USN*

CHEMISTRY OF ERYTHROCYTES, Clinical Aspects, by *H. Behrendt*, M. D. 227 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $5.75.

The title of this book might suggest that it would be of interest only to those doing research. The author states that the book could have been titled, "The Chemistry of Red Blood Cells in Health and Disease." This would have been an appropriate title because the book is certainly of interest to the clinician.

The first chapter discusses the structure, chemistry, and functional organization of the erythrocyte. Others discuss separation of the formed elements of whole blood, hemoglobin and its derivatives, proteins and nonprotein nitrogenous substances, carbohydrates, lipids, water and electrocytes, trace elements, and finally enzymes. Each chapter briefly describes the principle of methods of determination with very adequate references as to the technic of the determination. Normal values are then presented and finally the abnormal variations with the resultant pathologic state are presented.

Much light has been shed on these various disease states by chemical studies of the erythrocyte. Work in the field has been voluminous during recent years. For the first time one author brings all of the important work together and presents it in a lucid, concise, and readable manner. Presentation of clinical symptomatology is not and should not have been included. This is a reference book to be used as a necessary adjunct to the various textbooks of general use in all of medicine. The author is generous in his use of simple, easily understood diagrams and tables. The organization of the material is logical, the bibliography is complete and up-to-date. A definite contribution has been made to the literature by this synthesis of the subject. This is a worthwhile book for every physician's library be he clinician or investigator.

—*WILLIAM G. DUNNINGTON, Lt. Col., MC, USA*

RHEUMATOID ARTHRITIS, A Definition of the Disease and a Clinical Description Based on a Numerical Study of 293 Patients and Controls, by *Charles L. Short*, M. D.; *Walter Bauer*, M. D.; and *William E. Reynolds*, M. D. 480 pages. Published for the Commonwealth Fund by Harvard University Press, Cambridge, Mass., 1957. Price $7.

This is not a textbook on rheumatoid arthritis in the usual sense because it does not specifically cover etiology, pathology, and therapy. In essence it is a statistical analysis or, as is stated on the dust jacket, a "numerical study" of the varied symptoms, physical findings, laboratory data, X-ray changes, as well as the many incidental and accidental factors that may be related to rheumatoid arthritis. This series is unique in several ways. The study consists of 293 patients and controls admitted to the medical wards of the Massachusetts General Hospital from 1930 to 1936. The criteria for selection of the patients in this study is clearly and definitely outlined. The first re-evaluation of the group was in 1947 and the latest re-evaluation in 1954. There have been previous group studies on rheumatoid arthri-

tis but none have been as complete and thorough as this one. A number of these patients have been under careful study for over twenty years.

It has indeed been a monumental task and the authors are to be complimented for the painstaking and accurate reporting of this crippling and disabling disease. There are many outstanding chapters in the book; two stand out in particular, the one on "Diagnostic Criteria" and the one on "Subsequent Courses of the Disease." Each chapter is annotated with an excellent summary giving in clear and concise language the high points contained therein with a closing paragraph indicating objectives for further study. The general practitioner may not consider this book to be of great value because of the absence of a section on therapy; however, I am certain he will find the book interesting and rewarding. To the internist interested in rheumatology, and to the rheumatologist, this book will be a valuable adjunct to his office library as it is a veritable treasure house of information about the less well-defined and controversial points pertinent to rheumatoid arthritis. —*LEON J. NUMAINVILLE, Col., MC, USA*

PEDIATRIC CLINICS OF NORTH AMERICA, August, 1957, Symposium on Handicaps and Their Prevention. *Carl C. Fischer,* M. D., Consulting Editor. 799 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1957. Price $15 per year of four books issued quarterly. Sold only by a year of four consecutive numbers.

This is primarily a symposium on handicaps and their prevention in children. There is a statement on the responsibilities of the medical profession in the use of x-rays and other ionizing radiation, and an article on the surgical management of total bile duct atresia based on a case surviving four years. The symposium on handicaps and their prevention was thoughtfully organized, but of necessity each individual section was limited. The section on perinatal factors is timely, and another on immunization procedures is a concise review of present practices, richly documented.

The chapters on visual, hearing and dental defects are well presented short reviews reminding practitioners of the problems in their respective fields and with an appeal for early referral to the appropriate specialists. The discussion on social and emotional handicaps is a pleasant, readable summary of the psychologic problems of the growing child, and an appeal to the medical educators to improve the physicians' training in this area is appropriate. The section on education and training of children with handicaps emphasizes our present all-out trend to train every child to a median. The editor's summation of the community's responsibility to the handicapped child re-emphasises the purpose of this clinic; *i. e.,* to stimulate greater interest in the problems of the handicapped among those physicians caring for children and to re-emphasize the necessity of the team approach to the total care of the child.—*JOHN P. FAIRCHILD, Lt. Col., MC, USA*

TEN MILLION AND ONE, Neurological Disability as a National Problem, Arden House Conference, Sponsored by *The National Health Council.* 102 pages. Paul B. Hoeber, Inc., Medical Book Dept. of Harper & Bros., New York, N. Y., 1957. Price $3.50.

This book is a conference report which originated from a meeting of experts in the field of neurologic disease and rehabilitation at Arden House in Harriman, New York, during December, 1955. The symposium was sponsored by the National Health Council. The chapters contain the conclusions and recommendations obtained from group discussions of the various major sections of the problem. The volume will be of little interest to military medical officers not concerned with neurologic diseases. However, for specialists in the field, including physicians, physiotherapists, occupational therapists and social workers, the material presented will give a clearer idea of the magnitude of the neurologic disability program, and what experts believe may be done to make management, study, and treatment in this field more effective and complete. —*ARTHUR L. SCHULTZ, Capt., MC, USN*

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES, Volume 71, Art. 1, Pages 1-292, July 10, 1957, editor-in-chief, *Otto V. St. Whitelock.* "The Effects of the Sulfonylureas and Related Compounds in Experimental and Clinical Diabetes." Conference Chairman and Consulting Editor, *Rachmiel Levine.* 292 pages; illustrated. The New York Academy of Sciences, New York, N. Y., 1957. Price $4.

This is a collection of papers by eminent workers presented at a conference on the hypoglycemic sulfonylureas, held by the New York Academy of Sciences in February 1957. There is an introduction to the volume and concluding remarks by Rachmiel Levine, the conference chairman and consulting editor of the monograph.

These papers begin with a history of the discovery and development of the hypoglycemic sulfonamides beginning in 1942. Detailed and ingenious experiments follow in papers exploring and discussing the possible mode of action of carbutamide and tolbutamide. The discussions usually are models of logical thinking and deduction. They provide the reader with information about the effects of the compounds on insulin-I^{131} degradation, *i.e.*, on insulinase, peripheral glucose utilization, on the two intermediates of glucose metabolism pyruvate and lactate, the hepatic glucose output, on the beta cells and other metabolic processes. Several authors discuss the affect on pancreatic morphology. There are toxicological studies and a number of papers on the clinical experience with these agents.

The volume is most informative and interesting, even though it requires more than an average amount of concentration and time. It is excellent reading for the research worker and exciting for the clinician specializing in metabolic disorders. An extensive bibliography following each paper will enable the investigator to acquire even more detailed knowledge about the problem. This is also an up-to-date, authoritative, and compact source of reference.

—*M. M. DRISKELL, Capt., MC, USN*

An Introduction to BLOOD GROUP SEROLOGY, Theory, Techniques, Practical Applications, Apparatus, by *Kathleen E. Boorman* and *Barbara E. Dodd,* M. Sc. (Lond.), Ph. D. (Lond.) 317 pages; 30 illustrations. Little, Brown & Co., Boston, Mass., 1957. Price $7.50.

During the past year a number of books have appeared dealing with various aspects of the rapidly growing and fascinating field of immunohematology. One text concerns itself with the blood groups and their inheritance, another with racial distribution, another with technical methods, another with blood group substances, and another with clinical implications. The authors of this volume set as their objective the task of compiling a textbook that would deal with all aspects of immunohematology in order to give a general picture with detailed operation of an immunohematologic laboratory. To accomplish this a threefold approach was used: theory, technic, and laboratory and bench organization. The authors are quite capable of accomplishing such a work. Both are well grounded in the skills of blood group serology, and have actively participated in the investigation of many practical and theoretical problems that have developed as the science has progressed. The book is divided into six sections and three appendices. Generally it is designed as a reference book for those engaged in routine and special blood group serology. As a guide for those who do not specialize in this type of work, a special table of contents is included recommending certain specific portions of the book that will be useful. The authors have accomplished their task of presenting the "plans" of the safe and competent handling of a large volume of work. For this reason alone it is highly recommended.

—JOSEPH H. AKEROYD, Lt. Col., MSC, USA

PNEUMOENCEPHALOGRAPHY, by *E. Graeme Robertson,* M. D. (Melb.), F. R. C. P., F. R. A. C. P. 482 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1957. Price $14.50.

This work presents a well rounded prospectus of pneumoencephalography. The first section is devoted to the physics or mechanics and this is followed by an informative section on the technical aspects with attendant difficulties and rectifications. The next sections deal with respective regions, such as posterior fossa, cerebral aqueduct, third ventricle, suprasellar area and lateral ventricles, followed by a chapter on deformities of the lateral ventricles as the result of expanding lesions and in turn is succeeded by a short chapter that treats of neoplasm investigation in the cerebral hemispheres. Other illuminating chapters include head injuries, infections, atrophic lesions, vascular diseases, hydrocephalus and developmental anomalies.

There is considerable sagacity in this book, probably the result of the author's extensive neurologic background. It is best reflected in those parts devoted to diagnostic difficulties, studies in children, or the value of pneumoencephalography. The book is a considered basic requirement for those in radiology, neurology or neurosurgery. The bibliography is excellent as well as the diagrams and the other illustrations. *—RICHARD R. CAMERON, Col., MC, USA*

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be reviewed in a later issue.

MEDICAL DEPARTMENT, United States Army, Surgery in World War II. Ophthalmology and Otolaryngology. Editor-in-Chief, Colonel *John Boyd Coates, Jr.*, MC, USA. Editor for Ophthalmology, *M. Elliott Randolph*, M. D. Editor for Otolaryngology, *Norton Canfield*, M. D. Associate Editor, *Elizabeth M. McFetridge*, M. A. 605 pages; illustrated. Historical Unit, Army Medical Service, Office of the Surgeon General, Department of the Army, Washington 25, D. C., 1957. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $4.

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